The Builder.

VOL. LV. No. 2380. SATURDAY, SEPTEMBER 15, 1888.

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Glasgow Drainage and the Pollution of the Clyde.

THE combined question of town sewage and rivers pollution is one which in the Clyde Valley, as in many other centres, becomes periodically agitated, with corresponding intervals of quietude. It may be described as in the eruptive phase at present, but so far the discharges,—although brisk in a kind of way,—have scarcely as yet touched a phenomenal stage of intensity. The dredgings of Glasgow Harbour and of the deepened river generally have for years been disposed of by dropping them into the deep water of the estuary, where it opens northward into Loch Long. Some considerable time ago complaint waxed loud and incessant concerning the alleged pollution of the once stainless tide of sea water at this spot, and the outcry did much to reawaken the question as a whole; but other agitating influences have been at work too. There have been prosecutions, under the existing Acts, for the fouling of streams in Scotland,—prosecutions which have borne some little fruit of a stunted kind, and in several instances official inquiry has been astir. The belief has been gaining ground that at length some movement is to be made, other than letting loose a volume of talk or passing inoperative Acts of Parliament. Recently there was an official inquiry into the Loch Long grievance, followed by a report which, although cautious, and in part inconsequential, sufficiently justified the action of the complainers and shook the calculations of the opposite party. Hence the gradual reopening of the general question in the great city of Glasgow, which, in its formidable sewage problem, as well as in other less repulsive features, ranges, though a long way to the rear, of course, as the nearest second to London. Glasgow, within its tenements and under its streets, is essentially a city of water-borne sewage,—a system long vigorously decried and as warmly commended, and still on its trial. An early report (1858), at a period when the water-closets of Glasgow were comparatively few, spoke confidently of the water-closet system as "quite behind the age." Thirty years have since passed; the water-closet institution has grown enormously in Glasgow, and, whether it is quite behind the age or not, there is certainly even now no other rival system which may be confidently described as in front of the age, or abreast of the age, for that matter. It is still the age of experiment all over the field. Pipe connexions between sewer mains and the interior of dwelling-houses unquestionably suggest incontinent and most dangerous invasion on the part of sewer gas, but much may be done to make these connexions gas-tight, and it is on this object, of late years, that the watchfulness of the sanitary staff of Glasgow has been sedulously concentrated. Probably in no city in the world are the sanitary regulations so exacting, or so ruthlessly carried out. The owner of a tenement may be on the verge of ruin financially, but his drains, if reported on unfavourably, must be put right. Here there can be no question whether a property is overburdened or not; the official is instructed to shut his eyes entirely to the financial circumstances of the owner, and he does it. Not very many years ago sewer gas crept into Glasgow houses wholesale, and made victims in corresponding ratio; but of late, although water-closets have increased immensely, the death-rate has decreased. The credit of turning the flank of the insidious enemy must be set down, therefore, to a growing official watchfulness, aided by an abundant service of water, especially since the felicitous bringing-in of Loch Katrine.

Reference has been made to a thirty-years-old report on the drainage of Glasgow. This was not by any means the first of a numerous race. Of sewage deputations, inquiries, and reports, from first to last, Glasgow has certainly had more than enough. It has been dosed and stupefied, so far as the natural hardness of its head would permit, with sewage prescriptions, in concurrent terms often flatly contradictory, and generally in tones of the utmost conviction. The skilled report of 1858 wisely stepped out by warning those administratively concerned that the problem of ridding a large town of its sewage did not admit of an economic solution; and yet even now there are enthusiasts who swear vehemently that in city sewage rationally treated,—that is, treated as they would direct,—there is wealth untold. At that time, the Kelvin, a tributary of the Clyde at Glasgow, was a foul stream, as it is now, and it formed a part of the design of the two reporters (a professor of chemistry, Glasgow University, and an eminent London engineer) to deodorise the whole of its passing volume as an educative experiment, and keep it in that condition by constant treatment for the space of a few weeks. The deodoriser held in readiness for this treatment was a blend of sulphurous acid and carbolic acid, but the season turned out so wet, and the Kelvin was so frequently in flood that summer, that it smelt little or not at all,—conditions which, happily for the amenities of the Glasgow Exhibition so far, have been pretty closely paralleled this year. The interesting test was to be carried out on the following summer, however,—at all events, on the next dry summer; but by the time coalescing heats and droughts once more restored the stream to its normal offensiveness, the sewage agitation in Glasgow had rounded into the quiescent stage of its periodicity, and nothing was done, nor has anything of the kind been done to this day. At one period a deputation from the Town Council scoured the Midlands of England in quest of broader insight concerning the disposal of sewage; but the excessively hard conditions of low-lying inland English towns differ so greatly from the more favourable watershed surroundings of Glasgow that this trouble might well have been spared. Its main outcome was the importation upon the attention of Glasgow of a whole phalanx of individual conceits or fads. The system mainly at that time in vogue at Manchester and Birmingham caught some fancies, and Glasgow was recommended to adopt the tub-and-pail plan of removal; the earth-closet method was thought costly to an impracticable degree; but Liernur's system (central treatment by a drying heat, and theoretical result a marketable "poudrette") was looked to hopefully; water-closets in large works and institutions, and also in small houses, ought to be abolished as a beginning, and ordinary privies should be converted to the tub-and-pail mode. Much of the advice emanating from this deputation was given in light-hearted, off-hand style. If forced to purify the Clyde and keep it clean, why, cleanse the sewage liquids by precipitation and filtration at some suitable point in the neighbourhood of the city, and there you are! Run your cleansed liquid into the Clyde, and get rid of your sludge as best you may,—sell it if you can, or make up waste land with it if you can't. Another of the City's sanitary advisers pronounces all precipitation methods imperfect, performing lip service mainly, and effecting only a deceptive cleansing of the liquids; while a third waves away the liquid difficulty as non-existent, but is brought up

stock-still by the problem involved in the disposal of the precipitated sludge. That, he admits, is incapable of a satisfactory adjustment. There might be a feebly-fitful demand for a brief portion of the year, but this would not suit the book of a steady production susceptible of control only by as steady a dispersion. Opinions on irrigation, or sewage farming, have been as wildly conflicting. The method has been denounced on high authority as most offensive to the senses over widespread areas, and grossly unnatural in the treatment which it accords to the unhappy land operated upon. The soil is surfeited and sickened with excess of manurial ingredients, thrust upon it in season and out of season, and cannot possibly bear a healthy vegetation; municipalities relying on sewage farming may dream of a profit, but will do so vainly; the sewage farmer himself need look for no more than the barest living. On the other hand, sewage farms have been extolled as next door to perfection, and notably so on quite a recent occasion, at the annual congress of the British Medical Association, this year convened in Glasgow, when Dr. Drysdale, of London, and Dr. Carpenter, of Croydon, called upon London, Dublin, Liverpool, Glasgow, and all water-closet towns, to follow the example of Berlin, Paris, Birmingham, Croydon, and others, where it is alleged the farming system has proved a success.

Twelve years ago the sewage reform agitation came to an apparent climax in Glasgow, as elsewhere, on the passing of the Rivers Pollution Act, after nearly twenty years of trifling with the subject in Parliament. All river-befouling municipalities, with Glasgow specially included, believed that doom was at last upon them, and more earnest and louder still grew the cry for sewage remedies. But the Act of 1876, heralded with so imposing an air of business, proved but a toothless dog; defaulting drainage areas, to their surprise, found it almost perfectly "harmless," and things gradually made up their minds to go on as before. It contained no clause for the formation of independent Boards of Watercourse Conservancy—a special recommendation of the several Parliamentary reports on which the Act was founded;—it was a Court without stated judge or executive; in short, it had neglected to ordain the machinery necessary for the enforcement of its own provisions. Glasgow, like the rest, quickly recovered itself so far, and continued in its ill-doing, if not altogether with a mind at ease, at least with no dread of immediate consequences. But for all that, there is the writing on the wall against the unbridled pollution of streams, and now that Loch Long may not be much longer retained as a convenient depôt for the dredged sewage deposits and other accumulating sedimentary matter of the Clyde, and the City is on the eve of an important enlargement of its municipal area, this very stiff bit of necessary reform must soon be faced.

Clyde drainage conditions, while similar generally to those of the Thames, differ very materially in detail, and it is delusive for the Glasgow authorities simply to wait on the Providence of any series of London experiments. The Thames in its tidal reaches is a lively river, with a range of 18 ft. between the top and bottom of its tides, and a current velocity of two and three-quarter miles an hour on the average ebb; while the Clyde is a sluggish stream, with a crawl of only two and a quarter furlongs on the ebb tide, and a range between rise and fall limited to 9 ft. 9 in. Test-floats put in at the Upper City Bridge a little before the top of high water, a day or two in advance of the highest spring tides, aud with the Clyde in ordinary moderate volume, have pointed the way to some curious results. It was proved by these tests that floatable sewage entering the river at Victoria Bridge under similar conditions took a week to get down to Govan Ferry, a distance of two and a-quarter miles, but still within city bounds; fourteen days to make the mouth of the Cart, near Renfrew, and a month to reach Dumbarton; the denser portions settling down upon the bed of the river meanwhile, the thorough deepening of which has undoubtedly aggravated this lack of tidal activity, and in no small degree tended to transform it into a kind of settling-trough for the heavier of the temporarily suspended sewage impurities. According to Sir John Hawkshaw, the watershed of the Clyde basin, placing the seaward limit at Gourock, three miles below Greenock, extends to 1,481 square miles. It supplies three tidal tributaries to the main waterway, viz., the Leven at Dumbarton, with the surplus of Loch Lomond; the Cart from Paisley, and the Kelvin at Glasgow; the latter, however, a tidal stream for a few furlongs only. Above Glasgow the Clyde, itself not of great volume, receives five or six affluents, including the three Calders, the Avon, and the Nethan. It is a comparatively pure stream for a considerable portion of its upper course, and it is lively of habit as compared with the langour of its tidal section, breaking into several falls and rapids as it swiftly threads its way to the lower levels. Samples taken a little above Glasgow show that the river water, even in dry weather, is not greatly contaminated by the various fouling influences up the stream. Specimens drawn from the river in flood, after heavy rains in the Upper Ward of Lanarkshire, give about 15 grains of sedimentary matter, composed chiefly of finely-divided clay, with trifling proportions of oxide of iron, lime, magnesia, and organic ingredients. Directly the harbour of Glasgow is entered, deterioration increases at alarming speed, and at once the Clyde becomes a black, sullen, stinking flood, with, in summer, a continuous commotion in its depths and on its surface, through the struggling of the gases for freedom, these rising in incessant bubbles from the grosser filth below. Steamboat boilers are not particular as to the purity of the water they use, but here it is so unutterably foul that the small craft which ply on the harbour have to be watered from the shore. Eleven miles below Glasgow, at the top of ordinary tides, fresh water and sea water are found mixed in equal proportions; at half ebb the point of equality is two miles farther to seaward; at dead low water here, the proportion of salt is one-fourth only, and there is no appreciable saline infusion higher up than nine miles below Glasgow Bridge. The downward run of the Clyde at Glasgow in moderately dry weather has been estimated at 48,000 cubic feet per minute. It is difficult to estimate the volume of sewage and surface drainage which is here added with so little of ceremony, but it is probably considerably in excess of one-eighth of the whole, and it must be remembered that the addition takes place within a stretch of barely three miles. The condition of the Clyde after this treatment is abominable in the extreme, as may readily be imagined, yet it does not appear to propagate any special type of zymotic or other disease, even although at times the stench may be encountered in a form so concentrated as to act as an emetic. The sewage of Glasgow is collected into one set of main conduits, or gatheralls, and these, without chemical or mechanical treatment of any kind, take severally the shortest cut to the harbour (which is simply the river-course deepened), and discharge there amongst the shipping. The water-closet system is not quite universal, but it is in an overpowering preponderance, and has been constantly extending for years. What is termed the "pan privy" is in use to a considerable extent on old or smaller graded properties. The earth-closet is known, but, rightly or wrongly, the official sanitary eye regards it disdainfully, as quite unsuited for general adoption where large-scale operations have to be coped with. The city and outskirts abound in manufactories, the greater proportion of which pour their liquid refuse into the sewers; about thirty discharge into the Clyde direct.

Every known contrivance in the way of sewage disposal has from time to time been under the consideration of the authorities of Glasgow. The formation of an amalgamated drainage area for the whole of the Clyde valley has been spoken of, as already hinted, and very likely would by this time have been realised in some shape, if the Act of 1876 had been worth half the trouble it cost, or one-fourth the useless flurry it raised. As it is, Glasgow has been in the habit of concentrating its speculations upon its own individual case, with more than half an eye to the suburban burghs, which have long looked tempting for annexation, and are now considered very nearly ripe for that operation. Sir John Hawkshaw's plan was to lead off the sewage, in pipe or in tunnel, thirty miles south-westward to the Ayrshire coast. Messrs. Bateman and Bazalgette also reported early in favour of a similar coast plan. Mr. Bateman, in 1878, reviewed foregoing speculations and proposals, and at the request of the Council tabled three new schemes, with estimates to meet the prospective growth of Glasgow up to an extreme, bordering on a population of a million and a-half. These took the shape of congregating the whole of the city sewage at one or two points on the banks of the Clyde a few miles below the city, there to be treated as might afterwards be decided on, the governing general idea consisting in a sufficient cleansing of the liquids for discharge into the Clyde, and disposal of the residuum in the best way possible,—sinking it at the mouth of Loch Long being, at that time and until lately, confidently held in reserve as a sure and certain final alternative. Mr. Bateman did not conceal his doubts as to the partially-cleansed liquid remaining harmless more than a limited period after being consigned to the river; but a local chemical authority subsequently opined that not only would the liquid, after sufficient treatment by lime and sulphate of alumina, remain harmless, but that it might be run off at all times of tide, and at a point much nearer the city than that proposed in the scheme. Neither had this authority any serious misgivings as touching the disposal of the residuary sludge: the low tidal shores of the Clyde might be "made up" with it; it might be sent by rail to improve mossy and sandy wastes inland; or, again, if no better, it might be "hoppered" to the mouth of Loch Long, and there sent to the deep bottom of the firth. Of other less orthodox proposals there have been plenty. The Town Council, as a partial measure, at one time thought of constructing an upper level intercepting main drain to some such operating tank or reservoir as that implied in Mr. Bateman's suggestion, leaving the lower level to drain into the Clyde as of old; but their consulting engineer warned them against any tinkering of the sort, as but the gateway to trouble and expense incalculable. And no doubt he was right. A member of the Council pleaded strongly for a complete revolution in the house sewer-pipes and main drains of the city, whereby the sewage matter would be classed *ab initio* into, (1) Rainfall and house-slops; (2) Manufacturing refuse; and (3) Soil-pipe and urinal accumulations. The first-class, as comparatively untainted, might find its way into the river by existing conduits; the second by new culverts to settling-ponds fifteen miles down the Clyde; and the third class (also by a new set of conduits) to convenient depots near to the city, and there turned into no end of revenue. But the technically-instructed mind could not look kindly on this, and after a report by the Master of Works representing the huge original capital and annual outlays that would be entailed, and adverting to the very dubious prospect of anything but trouble from the accumulations of excreta, it was quashed. Another Utopian project was to collect all the sewage matters in one depot a short distance up the Clyde valley, there draw off its bad gases into the upper atmosphere, and after purification by precipitation and infiltration, and particularly by mechanical aeration, dispose of the liquid for manufacturing purposes partly, and run the rest into the Clyde through turbines, which would thus be made to supply a large portion of the pumping and other power involved in the scheme. Here, again, it would appear, the residuary sludge was to be consigned to the Loch Long receptacle, in barges passing through the city. This project also (in the author's elucidation of which there lurked some

suggestion of the vein of Jules Verne) was officially reported on,—and laid aside. The expert reporter said that as a scheme it differed from all others. He had never seen anything like it. Of course the sewage-farm alternative (for which a number of years ago, when the city was smaller, it was reckoned that quite ten square miles of land would be necessary) has been under consideration, but there never was at any time the least bit of heart in the contemplation.

It may be taken for granted at this time of day that Glasgow sewage, in its travels within the city, is to remain water-borne to the end of the chapter. The fight with sewer gas, the chief bane of the system, is being fought to the death, and increasing knowledge and fresh expedients yearly strengthen the hands of those who have undertaken the warfare. Sewer gas is a foe to reckon with still; but in Glasgow it is by no means the deadly agent it once was, and it may be accepted that the wholesale sealing up of the interior of dwellings against its insidious entrance is not beyond the stretch of sanitary engineering skill in Glasgow, aided by a plenteous tide of Loch Katrine wherewith to keep up a constant flushing operation, and ensure the prompt carrying away of all putrescible matters; and given also, of course, the requisite yearly and daily care, and an ungrudging yet not extravagant timely outlay of money for needful repairs. There is, however, still the question of the ultimate disposal of sewage. Simply turning it into the Clyde may not much longer be tolerated. Two general methods stand out in claim of adoption. The sewage may be manipulated locally, giving to the Clyde the liquid portion after a purification that will satisfy the rivers preservation authorities of the future, and getting rid of the solid residue at as small a cost as possible consistent with freedom from any fresh form of nuisance. Or, the native sewage may be sent bodily to the outer sea, as long ago proposed; and certainly, now as formerly, this is the alternative which of the two is the more magnetic in its action upon the public mind. The cost of sea outfall works will, no doubt, be very heavy, but Glasgow, and other places of like circumstances with it, may make up their minds that the sewage problem is not to be solved cheaply, however it be taken in hand; and they will do well also to bear in recollection that possibly the scheme which seems the most likely for economy at a short view, may run up by far the heaviest bill in the long run. Were the entire watershed of the Clyde turned into one drainage area administered by one comprehensive territorial council, the outer sea conduits might to most advantage, perhaps, be made to follow the downgoing shore lines of river and firth, the sewage of each village and town being caught-up in passing. If Glasgow has to go to work on the restricted basis of its own requirements, it would naturally strike direct for the broad lower estuary through the counties of Renfrew and Ayr, probably making partnership on the way with the large town of Paisley. Heavy pumping machinery and stupendous engineering works will be entailed, whatever the mode of disposal adopted, and in going to the sea a nice question will arise on the manner and position of the ocean outfall. It might be possible to carry that far enough out to safeguard the inshore waters entirely from nuisance; but, no doubt, in proportion to the offing attained, the cost would be enormously increased. Objectors to the sea method of disposal point out that, however capacious might be the sewage conduit constructed, it would be liable to collapse during some exceptionally extended downpour of rain, therein assuming that under no conditions whatever might any excess of volume be temporarily diverted into the ancient natural receptacle passing through the city. This is carrying pessimism too far. No theorist, however much of a stickler he might be, would ever contemplate closing the Clyde, or any other river, absolutely against any such rare and comparatively harmless overflow as this would represent. Of course, in angling for some sovereign remedy, the wholesale agency of chemicals has been looked to most hopefully by a few; but there is a strong conviction in Glasgow, as elsewhere, that the deliverance of Sir Henry Roscoe, in a recent report to the Metropolitan Board of Works, London, on the more stupendous metropolitan sewage difficulty, is a sound deliverance, viz., that the use of chemicals of any kind for the treatment of heavy aggregations of sewage must be considered as only a temporary expedient.

THE SCHOOL BOARD WORKS COMMITTEE.

WE presume it is partly in emulation of the Board of Works that the School Board for London must needs have its Special Committee for the discovery of malpractices in connexion with the Works Department, the proceedings of which are now issued in a volume of about 350 folio pages of questions and answers, the extent and solemnity of which appear somewhat ludicrously out of proportion to the comparatively unimportant nature of the disclosures arrived at after all this fuss; and if economy was the object and end of the inquiry, it might be a pertinent question for some economical member to put, what has been the expense of all this printing and reporting, which, by the way, seems to be badly done and full of obvious inaccuracies and obscurities? In many cases, indeed, it is difficult to understand what the questions and answers, as here reported, really meant. The substance of what has been elicited may be said to amount to this; that the former Architect to the Board, Mr. Robson, was supposed to look after more than any one man could possibly have looked after, and was very badly paid for doing it; that he was obliged to rely a great deal on the reports of subordinates, and that in a few cases he was misled thereby, and was rather too confiding, and that some bad work was done here and there for which he was officially and nominally responsible, but which it was next to impossible that he could have personally seen to. The report, however, contains a good deal of more or less interesting, and at times even amusing, reading.

The voluminous evidence given by Mr. Robson during two or three sittings of the Committee* presents a forcible picture of the high pressure under which the work of school building for London was carried on in the early years of the Board's existence. Mr. Robson gave a short historical sketch of the manner in which his department came into work, and his own peculiar position was developed. He was employed at first as a consulting and advising architect only, at a salary of 500*l.* a year, and the Board went into a series of competitions, about thirty in number, on all of which Mr. Robson advised and reported. Mr. Robson got tired of this, and said he must give it up—perhaps with some prevision that the Board would not be very willing to part with him; at all events, it was then intimated to him that there was a desire that he should build the schools, and he proposed to do it on commission. That proposition was lost, and he was then offered 1,000*l.* a year, with the understanding that he should give the Board his first consideration, but not, as we believe was supposed in some quarters, that he should take no other private practice. For this 1,000*l.* a year Mr. Robson states in the evidence that for some time he was carrying out an amount of work by which, in ordinary practice, he would have made 25,000*l.* a year. There is some discount to be made from the comparison on two grounds; 1st, that he admits that the work was more than he could pretend to personally superintend; 2nd, that he had all the subordinate assistance found for him, and not at his own expense. In other respects Mr. Robson's account of the work shows discrepancies; he speaks in one place of about fifty schools a year, and in another place of schools "at the rate of two a week," which latter seems to be an exaggeration. But in a general way, Mr. Robson's evidence gives a remarkable and, indeed, almost dramatic picture of the tremendous pressure of work going on during the time that he was architect to, as it appears to us, a very ungrateful Board. The whole thing seems to have been a constant drive to get through work somehow or other, and in as regular a way as possible, which it was almost impossible to get through in the time. The responsible architect to the Board was, as he says, "doing the work of six architects," and was carrying on a certain amount of private practice at the same time. Of course the natural comment would be that he should have relinquished the private practice, and any demand on his part for increase of salary was met by the counter demand that he should relinquish it; but we do not gather that the Board ever offered their architect any salary sufficient to compensate for that sacrifice. The main conclusion to be arrived at from the report, as far as the architect is concerned, is that he served the Board with remarkable skill and energy under most difficult circumstances and for very insufficient remuneration, and got through an amount of work, including not merely routine work but invention (for nearly every school built for the Board has its own plan and characteristics), which only great energy and resolution, coupled with exceptional powers of work, could have enabled any man to get through at all. It is a very poor return for all this that the architect should be invited to be badgered with cross-questioning by a Committee set on foot by members who are apparently anxious to earn a cheap reputation for economical policy.

The main point in which there has been an attempt to saddle the architect with responsibility for bad work appears to be in regard to the foundations of the Barnet-street Schools, the story about which rests mainly on the evidence of Mr. Nicol, the clerk of works, a gentleman who asserts that he was subjected to "persecution" for having discovered that the older portion of the school had not proper foundations. We do not see any evidence about the persecution, but Mr. Nicol's manner of giving evidence suggests the idea that he was a clerk of works desirous to magnify his office, and to make the worst of anything he might find wrong, and that he was not troubled with much reticence or modesty. Mr. Nicol, however, certainly made a couple of points. He reported the foundations defective, and they were defective, and had to be underpinned. It was "just about the time of the fall of the Tay bridge," and he "felt nervous," and our impression from comparing one part of the evidence with another would be that he exaggerated the state of the case. Mr. Robson appears to have depended on the report of his superintendent, Combe (now dead), who was appointed specially to relieve him from inspections which he could not possibly make in person, and who appears not to have been so trustworthy as he was supposed to be. Mr. Nicol's statement that he was "afraid of the building coming down about their ears" when orders were given to uncover part of the foundations, looks to us a good deal like a bit of dramatic effect. The one thing we do not understand in Mr. Robson's part in the matter is that he appears to have written to the clerk of works that he had "personally inspected" the foundations, and nothing was wrong. We cannot see any explanation of that "personally" unless it meant that his responsible superintendent had personally inspected them, which is not quite the same thing. Mr. Robson in his evidence, however, throws doubt upon the whole statement of the other witness, and asserts that he was a clerk of works who did not know his duty, "and was always fussing about things that did not concern him." The two statements of the witnesses are irreconcilable, and it is possible that Mr. Robson's memory was at fault; but, on the other hand, the animus

* It should be noted that the Committee had no power to compel the attendance of witnesses; all those who gave evidence attended voluntarily.

in Mr. Nicol's evidence is pretty obvious, as well as the motive for it, as he had been rebuked by the architect for "want of practical knowledge and of common sense." We will, however, give Mr. Nicol's statement in his own words about another matter in which he claims to have caught the Architect's department tripping (he hardly pretends that he could throw the blame on the Architect himself):—

"1880. Mr. Helby: You had some trouble at Shepperton Road School?—What was that?

The Witness: The superintendent clerk of the works was not very friendly on account of these things, and I felt it was not exactly the thing; and, before starting the job, I discovered a mistake in the plans. I told him that I had found a mistake in the plans. He said, 'What is it?' He was not very sharp in understanding plans, and I did not care to give him my brains, and I said, 'You find it out; you report the same to the architect.' He reported the same to the architect, and the architect sent back a message to me next day to say I was a fool, and to build according to plans.

1581. Mr. Barnes: Was that a verbal message?—Yes.

1582. Who brought that?—The superintendent clerk of the works. I said, 'Phebey, go on.' I said 'That will show itself when it comes to 15 feet high.' We built until it came to 15 feet high, and the men on the job laughed at it, because they thought it was the clerk of the works' fault, and that the builder's foreman had made a mistake. It was a double staircase: it was not exactly like the double staircase in this building, but when we came up, the last landing was only three feet above the landing below; consequently, nobody could get up to the top landing of all. Our schools were built 15 feet from ceiling to ceiling, and the top landing was only 3 feet away from the landing immediately under. Consequently, there was no possibility of anybody getting up without crawling up.

1583. Mr. Lobb: How high had you built it?—Fifteen feet—the staircase itself. I said to the foreman, 'Well, I will go to the office myself now.' I came down, and Mr. McFarlane asked me what I wanted. 'I want to see Mr. Robson; is he in?' 'No,' he said. 'What do you want?' 'I want to see him very particularly; I will not tell you.' 'Won't Mr. Bailey do?' 'I said, 'Perhaps Mr. Bailey will do.' Mr. Bailey asked me in, and he said, 'Well, Nicol, what do you want?' 'Well, I have come down about that staircase at Shepperton-road.' 'We have heard something about that; there is nothing wrong with it?' I said, 'We have built it according to plan, and you will have to come and see it for yourself now.' I said, 'At least, there was a message sent up to me that I was a fool, and knew nothing at all about the staircase.' I said, 'We have built to the plans, and you had better come and see the building for yourself.' 'Well,' he says, 'What is wrong with it?' I said, 'Would you kindly pull out the plans?' He said, 'Yes; here they are.' I looked at the plans, took my pencil out. 'Give me a bit of paper,' I says. 'You see that building?' 'Yes; I do not see any mistake there.' But I drew a very rough section with the pencil. He said, 'Do you mean to say it has been built like that?' He said, 'The whole thing will have to come down.' I said, 'I knew that before I started, but I was a fool, and I was told to build to plans, and we built to plans.'"

Mr. Robson, on being questioned about this, said he remembered nothing of the kind; that it was probably a builder's error, which had been corrected before he could know of it; and, as he says elsewhere, "the personal responsibility of the architect in such a position as this would mean that he would have to do the work of twenty men himself." However, if Mr. Nicol's account is accurate, it, no doubt, carries the moral: "Do not lightly refuse to investigate a clerk of works' complaint."

The description of the manner in which the specifications and quantities were got up tells of the same haste and struggle against time to which other evidence points:—

"2067. What was your practice with regard to the designing and building of schools? Did you yourself draft the specification?—No. The notes were made of the specification and it was then sent to the quantity surveyor. After a certain number of schools had been built, we got a standard set up in type which was altered to meet the requirements of each school. It was thought it would save both time and expense in printing.

2068. Were those alterations made by the architect or by the quantity surveyor?—By both. The notes had to be made in the first instance, sometimes verbally, and sometimes in writing, and then the quantity surveyor took it up, and in the process of measuring he would find certain things necessary to insert, and he would send it back with his emendations, and it would go to the printers to be set up.

2069. Were the alterations made before the quantities were prepared or subsequently?—The final settling of the specification was after the quantities were prepared. The quantity surveyor then added his points. The object was, that the quantities and the specification should exactly agree, for I always hold that the quantities ought to be a part of the contract, and that was never so here.

2070. Who was responsible for seeing that the quantities and the specification agreed?—The quantity surveyor, of course.

2071. And if in any buildings it was shown that they did not agree, how far would the architect be responsible for that want of agreement?—I really do not know. The point has never come before me before."

On this kind of ground it is hardly surprising that quantity surveyors should begin to think they are practically the architects of the building. The system is one which must be excused on the ground of the struggle for time, but certainly not one which commends itself to us. Another passage which affords matter for comment is included in a question by Mr. Christian* to Mr. Robson, and the reply to it:—

"2161. As to one of the practices which have been carried on, I should like to ask Mr. Robson a question, and that is, I find that almost all the work is pointed after it is finished. Whether it is done in cement or whether it is done in mortar, it is pointed in the case of gables and in the case of chimneys. I have seen there has been what they call the 'tuck' pointing,—which I think is an abomination,—done after the work is finished; and that is done to a very great extent, and, of course, in such a building as a Board-school, which is of very great height, it is a very serious matter. Why should not all the joints have been finished straight off?—Well, no one knows better than yourself, Mr. Christian, that the 'tuck pointing' is part of the style in which the schools are built, and the idea of 'tuck pointing' is that it is a thing that can be renewed at intervals of years, and make the building look fresh again.

2162. That I am quite aware of, but in the case of such buildings as these, you have got an outline of the style and all the general lines. Surely it would be more reasonable, considering that course of pointing [*sic*], to finish as you go on, even if you have to build in bad weather, and build all work which is out of general reach in cement. It appears to me that it would be a very serious matter as regards the cost of repair, and I think in a case of that kind I should have disregarded the style, and made the job an honest one at the beginning, Mr Robson?—Pointed them in cement at first?

2163. I would have finished them.—You mean finish as you go along?

2164. Yes.—Many people advocate that. I do it in Gothic buildings.

2165. Then why should it not be in other buildings?"

To which latter question there seems to have been no answer; and we echo "Why, indeed?" And what can be the definition of "style" in which tuck pointing is regarded as "part of the style"? That is, indeed, a new definition of "style."

Other points against the Architect's department might be extracted, more or less colourably, from this voluminous book of evidence about trifles (mostly), but on the whole the impression left after reading the evidence is that it has been an unnecessary and got-up enquiry; that the School Board have had a great deal of talent and energy brought to bear upon the building of what are, on the whole, an admirable series of schools; that they have paid very little for it; and that they have not shown a very admirable or generous spirit in baiting with cross-examinations the men who have done their work under great difficulties; and some people may be inclined to suggest that possibly the near approach of election time at the School Board has had something to do with this display of economical ardour and incorruptibility on the part of some of the members.

Greek Archæological Treasures.—A Danish archæologist, writing from Athens, asserts that the Greek Government is taking the most active steps with a view to put a stop to the export of Greek art treasures, which takes place in spite of the law of 1843 to the contrary. The ports of Piræus, Nauplia, and Corinth are being closely watched, and even passengers' luggage is examined when suspected of containing archæological treasures.

* We presume that Mr. Christian and Mr. Rickman, whose names appear in the inquiry, were called in as professional advisers to the Committee. The Report gives no statement of their position, nor of the constitution of the Committee, or the attendances at the various sittings.

NOTES.

A SEWERAGE scheme, involving an expenditure of no less than 450,000*l.*, with an additional 40,000*l.* for the purchase of land, formed the subject of an inquiry which was opened in Manchester on Monday by Mr. Samuel Joseph Smith, C.E., on behalf of the Local Government Board. The Corporation propose to construct intercepting sewers for the city, and to carry the sewage by two principal sewers, of 7 ft. and 9 ft. in diameter, to the city boundary in Stretford-road, from which point it will be taken by an outfall of 10 ft. 6 in. along Stretford-road to works near the Irwell. There the sewage will be dealt with in tanks which will be used for precipitation purposes, the effluent, on leaving the tanks, flowing over a weir, and being treated by the system of "downward intermittent filtration." The final destination of the effluent (calculated at 10,000,000 gallons per day) will be the Manchester Ship Canal, the Corporation being under an agreement with the Canal Company that the water shall not be injurious to the canal. The residuum of the sewage will be disposed of according to the Leeds method. The sewers are to be sufficient for a population of 500,000, and are to provide for rainfall as well as carrying away the sewage. The scheme is formally opposed by a number of Local Boards in the district, and also by over a hundred property-owners and occupiers.

IT is natural that daily newspaper critics should felicitate Sir F. Bramwell on having, in the words of one journal, made the Presidential address of the British Association "intelligible to ordinary readers," and if the British Association were an institution for the popularisation of science, this praise would, no doubt, be much to the point. Sir F. Bramwell's address was certainly intelligible to any one, and formed a somewhat dramatic and occasionally humorous summary of the bearing of engineering and constructive improvements on the conduct of everyday life and occupation: but to our thinking something higher than this is to be looked for in the opening address of the British Association for the "Advancement of Science." The annual meetings of the Association tend to become more and more a kind of mere scientific amusement in the eyes of many of those who attend them, a form of mild dissipation; and however much this may be practically and unavoidably so in regard to a proportion of the audience, it is not desirable that Presidents of the Association should assist this tendency by reducing the Presidential address to a piece of popular gossip on some of the superficial aspects of science. The address in question was, no doubt, amusing to many of those who listened to it, but it was not calculated to maintain the status and dignity of the annual meetings of the Association, and we hope its character will not be taken as a precedent for future addresses.

THE paper read by Colonel Hazard at the British Association, of which we have received a copy in full, with illustrative diagrams, offers important, and we think in the main practicable, suggestions as to an improved system of underground railway conveyance for large cities. His system could hardly be applied except to streets which had been laid out and constructed with that special object in view, as the system involves a very compact arrangement of the space under the roadways in a city, and the utilisation of the space so as to provide properly for drainage and lighting on either side of, and without interference with, the railway routes. His proposal is to carry the roadway on iron columns and girders and steel decking, the section of the roadway being no thicker than is just requisite to get a good carriage-way, and beneath this to have a continuous trench, about 12 ft. deep, with a concrete flooring, on which would be laid four lines of rail, the two inner ones for express trains up and down between important points,

the two outer ones for slow-stopping trains similar to our present metropolitan railway trains. Outside these, again, would be continuous galleries for the laying of gas, water, drainage, pneumatic and steam pipes, and electric cables: the galleries accessible by entrances at various points, and all the nuisance of taking up the roadway being done away with. At double stations the fast trains are to be entered by platforms *over* the slow trains, the slow train road being sunk at these points, with down and up gradients. The trains to be driven by electric power. The author proposes that the trains should travel in tubes, to which they would act as "loose-fitting pistons," and would operate a system of ventilation by their own movement. This portion of the scheme we should feel very sceptical about; but the main idea is well worth consideration when the opportunity may occur; and the Paris authorities, who are so much exercised about a metropolitan railway for their city, might do well to pay attention to Col. Hazard's suggestions.

THE *Art Journal* for this month contains an article on old Boston and its steeple, by Mr. C. Whymper, with some sketches of picturesque houses in Boston which are interesting; the two sketches given of the celebrated "stump" are not very adequate, and by no means do it justice. "William of Wykeham" is the subject of an article really on Winchester, with some admirable sketches by Mr. Raffles Davison; and there is an article on "Some Provincial Clubs," with sketches of the Conservative and Liberal Clubs in Birmingham, not by any means well done—the sketches we mean; they are among the worst examples we have seen of the modern habit of what we call "scratchy" architectural illustration, with a haze of uncertain lines and no detail. This is a very easy but rather useless way of drawing architecture. The *Art Journal* is devoting a good deal of space to architectural subjects, sometimes very well illustrated; but it seems to be very unequal in this respect, and admits illustrations occasionally by artists who do not at all understand how to draw architecture.

WE have received from Mr. Batsford a volume of designs for cathedrals* by the late Mr. Pullan, under the title "Studies in Cathedral Design," most of which appear to have been made in competition for various projected cathedrals: in one case, that of a design for Liverpool Cathedral, the design seems to have been made merely as a study for a building to suit the site, and for the author's own pleasure, as it was not submitted to any committee. We can hardly agree with the statement at the commencement of the preface, that "this is a cathedral-building age": certainly not as regards England and the colonies. The formation of new sees has led to an occasional Cathedral being required; but in the two latest most important instances, Truro and Liverpool, the money has been with difficulty found to build half of Truro Cathedral, and apparently cannot be found at all (so far) for Liverpool Cathedral. In regard to the Anglican church, Mr. Pullan suggests that the long aisles and nave of the Mediæval cathedral are no longer appropriate, and that structures of great size are not now required; nor are they, in a practical sense; certainly not the long nave; but it does not seem to have occurred to Mr. Pullan that another form of plan altogether might be available for modern use, even on a large scale. The design for Lille Cathedral, illustrated in the book, was sent in an open competition, and this being for a Catholic Cathedral, the Mediæval plan is frankly adopted. The author applied to this the scheme of design on the basis of certain angles of proportion, to which he attached some importance. The design, which obtained a premium in the competition is a fine one; one of the best in the book. The illustrations include designs for some of the details and accessories of the building. The west elevation of the design for Cork Cathedral, for which Mr. Pullan was an invited competitor, is very like an imitation of Burges's work, but a good façade in itself. The design for the Liverpool Cathedral is of some interest in regard to plan; it is apparently intended as an example of the author's theory of the comparatively small cathedral for modern Anglican worship; it shows the unusual arrangement of an octagonal chapter-house at the extreme east end, connected with the choir ambulatory by a short passage. This is a variety, but we do not know that the architectural result is very happy. An alternative perspective view shows the same arrangement with a rectangular chapter-house. The best piece of architectural composition in the book is the ideal design of a "Geometrical Decorated Cathedral" (Plate 33). The book would have had a more practical value had it shown a more decided attempt to treat the modern Cathedral in an original manner and from the modern point of view. As it is, the designs are all entirely mediæval in character and plan.

* Studies in Cathedral Design. By R. Popplewell Pullan, F.S.A., F.R.I.B.A. London: B. T. Batsford. 1888.

WE are not surprised to find, from a letter from the churchwardens of Cossey church in Wednesday's *Times*, evidence that Dr. Jessopp's letter as to the iniquities committed there was, as its style implied, absurdly exaggerated. The churchwardens deny that any of the nave windows retained, within the memory of any one living, portions of the old stone tracery: they state that one of Dr. Jessopp's "five windows of rare ingenuity and beauty of design" was inserted by the present vicar twenty-five years ago, and that the "considerable fragments of brilliant stained glass" amount to a few pieces making about two superficial feet in all, and which are carefully preserved at the Vicarage. They might as well have been preserved in the church, certainly. The churchwardens add—

> "Our church was in a wretched state; we received frequent complaints of the water coming through the roof; the damp and the cold draughts of air made it impossible for persons in delicate health to attend the church in winter, and the attendance in consequence was meagre in the extreme. We appealed successfully to the public, and found ourselves with 600*l*. Archæologists had not troubled us in the past; but now we had money to spend we were besieged with advice, and had we followed all of it our church would now be a miserable jumble of fads and crotchets. We may have made mistakes. Who does not? But we say to all, Do not base your conclusions upon Dr. Jessopp's letter, which we distinctly say is full of gross exaggerations."

Of this we were convinced from the very style of the letter itself. Because of some mistakes in an apparently well-meant attempt to repair a dilapidated church, Dr. Jessopp, quoting from Browning, says:—

> "One more triumph for devils, and sorrow for angels;
> One wrong more to man, one more insult to God!"

These lines are used by Browning ("A Lost Leader") in regard to the most tragic spectacle, perhaps, that we can contemplate—the desertion of a great cause by a great intellect from paltry and selfish motives. A man who could solemnly apply such words to the alteration of a village church, in the course of apparently necessary repairs, must, to our thinking, be slightly out of his mind. Mr. Carpenter follows with a letter on the same side, in which he states that he and Mr. Christian had examined the church, and had concluded that by careful and conservative repairs the ancient windows might have been retained, and the design, "and probably also some of the old oak timber" of the nave roof, might have been retained. This "probably" looks very doubtful, and suggests that Mr. Carpenter's plan would have resulted in a modern imitation of the old roof, which another school of anti-restorers would have objected to just as much. Then he quotes another letter from the irrepressible Dr. Jessopp, asking "whether life is worth living" in the presence of such iniquities as these. Architects and anti-restorers do a great deal of damage to their own cause by such extravagant expressions as these. They repel people whose common sense still retains its balance, and who would support them if they were more reasonable and moderate in their views and in their language.

ARCHITECTURAL ASSOCIATION VISITS:

HATFIELD HOUSE.

ON Saturday last no fewer than 110 members of the Architectural Association paid a visit to Hatfield House, by special permission of the Marquis of Salisbury. Prior to inspecting the building, the members assembled in the Marble Hall, where a short historical sketch of the house was read by Mr. J. A. Gotch, Past President, which we print in full below. The house forms three sides of a hollow square, and is built of red brick, with dressings of Caen and Tettenhall stone. Despite its general plainness, or perhaps in consequence of it, the building is charmingly picturesque, with its deep red brick colouring, its angle turrets, and its central clock-tower. Entering by the north front, and passing through the richly-carved screen, the Marble Hall is the first feature of interest, and forms an admirable example of an Elizabethan hall, with its wealth of panelling and carving,—much of it the work of a French or Flemish artist-workman, Janivere,—its Gobelins tapestry, and its interesting portraits of Mary Tudor, Philip of Spain, Mary Stuart, and Elizabeth. Here also are the battle-flags of English regiments and four captured flags of Napoleon. The original chimney-piece has disappeared, and its place is occupied by a more modern design, by no means out of harmony with the older work. As much cannot be said for the modern ceiling-decoration by Taldeni of Siena, which, on the contrary, sounds the only jarring note in an otherwise harmonious whole. The next point of interest is the chapel, with its curious contemporary Flemish stained glass. The general effect of the chapel is hardly satisfactory, the white marble altar, however beautiful in itself, especially disturbing one's sense of the repose which should everywhere be the predominant quality of the internal finishings of such a house as Hatfield. Here, too, there is much of the modern work of Taldeni. The Long Gallery, on the first floor, is one of the most charming features of this very charming house. It is 160 ft. long and 20 ft. wide, lighted by eight large windows, with an oriel in the centre. The ceiling is elaborately panelled and enriched with gilding. The walls are panelled, and a parqueterie floor completes the decoration of the room. The grand staircase is, as in most houses of the period, of great interest and charm, with its rich carving and heraldic insigna, its curious wicket-gate, designed to prevent the incursion of the hounds, and its many examples of the work of Albert Dürer, Van Dyck, Lely, Kneller, Zucchero, Reynolds, and Ramsay. Other notable points in the house are the winter drawing-room and the library. The winter drawing-room or chamber of King James is the most gorgeous if not the most beautiful room in the house. The ceiling, panelled and enriched by elaborate and beautiful pendants, has been richly decorated in gold and colour, while the deep crimson of the velvet chairs and sofas and the heavy gilding of the furniture add to the general richness, which is further emphasised by the luxurious marble chimney-piece, with its life-size statue of James I. in the central niche. In this room are some of the finest portraits; amongst them that by Sir Joshua Reynolds, of Mary Amelia, Lady Salisbury, the grandmother of the present Marquess, and Richmond's portrait of the present Lady Salisbury and her eldest son, Lord Cranbourne. The library is, as it should be, an eminently liveable room, depending chiefly for its decoration upon the books. Here are the famous Cecil papers, with their wealth of historical information on the real life of Edward VI., Elizabeth, Mary Stuart, Catherine de Medicis, Henry Quatre, Wolsey, Bacon, Essex, Raleigh, and other makers of Elizabethan history. Space will not allow of a full description of the remaining rooms of the house, the billiard-room, morning-room, State bedrooms, &c., with their numerous portraits by Zucchero, Van Dyck, Kneller, and others,—an intellectual and artistic feast that added much to the enjoyment of the visitors. The grounds, also the privy garden, the maze, and the vineyard were visited and appreciated by the members.

The following is the paper read by Mr. Gotch to the members :—

"There is at Hatfield more to be seen than the great mansion of the Salisburys. In looking at the new palace we must not overlook what remains of the old, for not only does it serve to point the difference between two styles of architecture—the Tudor and the Elizabethan—but it also furnishes a constant reminder of how the new palace came to be built. Hatfield, or Bishop's Hatfield as it used to be called, belonged for many centuries—even before the Conquest—to the Bishops of Ely, and here was a palace for their delectation. Towards the end of the fifteenth century John Morton was Bishop of Ely, and he rebuilt the palace hard by the church in the most approved modern style. From a plan of it which is preserved in the house, it consisted of one large court, with a way through from west to east. It had the usual large hall; it had a large staircase at each corner of the court, which was surrounded by buildings one room wide, nearly all thoroughfare rooms. Many of them were enlivened by bay windows. Some portions of these buildings—the outer gateway and the west side of the main block—are still left, but are used as stables. Scarcely half-a-century passed after the completion of this building when the monasteries were dissolved by Henry VIII., and that monarch, who liked the place, gave lands in other parts of the country in exchange for Hatfield, which became thenceforth a royal palace. Here lived young Edward till his accession, soon after which he granted the place to his sister Elizabeth; and here lived that princess during the stormy times of Mary, under the protection and surveillance of Sir Thomas Pope, by whom she was sometimes entertained with conferences respecting the building of Trinity College, Oxford, and sometimes with masques and pageants, till her sister interfered and stopped them. Here she remained embroidering in gold and silver, reading Greek, and translating Italian till the day when, beneath the oak which still bears her name, she received the news that she was Queen of England. After that event she came here only at intervals, and the palace passed in due course to King James. He, however, seems to have cared but little for it, for having stopped three days on his way to London at Theobalds, the seat of Sir Robert Cecil, he was so enchanted with that place that he prevailed on its owner to exchange it for the royal palace and manor of Hatfield. That is how Hatfield came to the Cecils.

Sir Robert was second son of the great Lord Burghley, Elizabeth's trusted councillor. That statesman was himself a great builder. He it was who, besides a large house in the Strand, built Theobalds in this county, and Burleigh House by Stamford Town. Burleigh he left to his eldest son, Thomas, who was created Earl of Exeter. Theobalds he gave to Sir Robert, afterwards created Earl of Salisbury, and Theobalds Sir Robert gave in exchange for Hatfield. But the old palace of Hatfield by no means suited the magnificent ideas prevalent at the time, and before the exchange was completed we find the new house projected, as witness the following letter to Sir Thomas Lake from his "loving friend, Salisbury," written on April 15, 1607.*

"Sir Thomas Lake, being very desirous to see the house of Theobalds and Parcks (now drawing neere the delivery into a hand w^{ch} I pray God may keepe it in his posterity untill there be neyther tree nor stone standing) I must confess unto you that I have borrowed one dayes retraict from London, whither now I am returning this morning, having looked upon Hattfield also, where it pleased my L. Chamberlaine, my L. of Worcester, and my L. of Southampton to be contented to take the payne to view upon what part of ground I should place my habitation, where I doubt not ere it be long to have the honor to see my Master. This I write because you may knowe that yor lrēs [letters] of yesterday will find me in my pilgrimadge at my little lodge w^{th} a fayre sight of read deere before myne eies."

"My Lord Chamberlaine" was the Earl of Suffolk, who himself built two large houses, viz., Audley End, in Essex, and Charlton, in Wiltshire, so that his opinion might be considered worth having.† The new work must have been started very soon after their visit, as already, in 1608, we find one of the chimney-pieces dated, and in May of 1609 we find among the State papers "An abstract of all the charge that his L^{p} is to be at more than he hath disbursed for the full finishing of his building at Hatfield, according to the plott." This document gives, under each trade, the estimated sums still required, which amount in the gross to £8,146, but if certain things are left out,—if the job is cut down,—a saving of £710 can be effected. The following note is then added, which shows the state of the building some two years after its commencement :—

"If it please God, by the last of July (the note is dated 25 May), the carpenters will have reared the Hall roofe and all the roofe betweene the two towers and the great chamber floores and flat formes, and the 8 tipes upon the towers and all the carpentary worke, for the slater to cover the house. But if we alter the property of the building, it will not be ready to cover by Mickelmus next, bycause the roofes are yet to saw and to frame."*

At intervals throughout this year of 1609, we meet with references to the progress of the work, and in April of 1610 we find the building proprietor somewhat restive under the continued cost, and wanting to know why the cost has exceeded the estimate. To a formal order requiring "Mr. Basil, survayor of h's Ma^{tis} workes, and Tho. Willson, my servant," to look into the matter, he adds in his own hand :—

"When you have made the survey of all things belonging to my sayd building as is above requyred I wold have you sett all things downe in wryting, and cause Sbawe and Lyming [two master workmen apparently] to sett other hands therunto. And further whereas they wold have 2,500 thousand brickes more made this yeare, I wold have them sett downe the reason why they requyre soe many, I being informed that much fewer will suffice." †

A few days afterwards the estimate duly arrived, signed by all concerned,—Mr. Basil, Wilson, Shaw, Liminge, and Jeffry Culcheth, who was apparently a foreman.‡ Six months later Wilson sends a "Bill of disbursements about Lord Salisbury's house at Hatfield" for the preceding year; § and on November 8, 1610, Robert Liminge sends Wilson another long report on the state of the works. From this lengthy document a few short extracts will help us to realise the actual building of the place, which, after all, was performed by ordinary human beings, and not, as Gray would have us think, by "fairy hands." Liminge writes :—

"Mr. Wilson, my dutie remembered unto you. The mason is in hand with the chapple window, and that would be very well made an end of before Crismas if we had stone brought downe, ffor he hath above 30 workmen at worke. And there is a great deale of masonry to doe about the house besides the window, w^{ch} workes will aske mutch time. The mason talketh of discharging some of his men for want of stone, w^{ch} by no means must be, for the hinderance of the bussiness in the springe. Therefore, sir, I would intreat you to take all the courses that you can for sending away of the stone from London. . . . . The front of the gallery is brought up above the first story to the height of the pedestalls, halfe the rainge and the other part is wrought ready to sett at the Springe. The Mason is paving the great beere seller with purbeck, and hath layed some of it."

The bricklayers are next mentioned, and among other things they are "in hand with small dreanes within and without the house for the drawing away of the water from the foundations and romes . . . . And I thank god the maine building standeth firme and sure in every place." He then goes on to the carpenters, who "have brought up steares in six severall places from the ground to the top of the house"; and the plasterer, and the plumber.

"The glasier (he says) shall sett up as mutch glase in those windows where the scaffoles may conveniently be taken downe and we will buy a load or two of pease straw for the stopping of the other windows for the keeping of the weather out of the house. . . . Sir, (he concludes) I would entreat you to tell Mr. Bowle that I will bring a just mould of the lights of the Chapple windows: according to the proportion concluded of betweene him and I at my next retourne to London. So wishing you health and prosperity, I end.—Yours, in all dutie, Robert Liminge."‖

The "mould" of the chapel window may possibly have been for the purpose of procuring the stained glass.

The spring of 1611 came, and with it very considerable activity, for on July 1st of that year the house is reported, room by room, as being nearly ready for occupation; at any rate, the ensuing Thursday would see most of the rooms matted, and hanged, and ready, and the upper lodgings would be hanged and ready for the Lord Cranborne on Tuesday night.¶ In the parapet above the main south entrance is the date 1611, so that we may safely conclude that the house took a little over four years to complete. The total cost, notwithstanding the estimate which we have heard, was,—according to the building accounts published in Mr. P. F. Robinson's excellent monograph on Hatfield,—7,631*l.* 11s. 3d., including impaling the parks, some work in the gardens, and bringing water to the house. The various items are of very considerable interest, but too long to repeat here. Three only will I trouble you with. The painting, gilding, and colouring of the whole place came to 407*l.* 9s. 1d. The carving of the stone lions about the house, the pew-heads in "the Chappell," and other work duly specified came to 130*l.* 14s. 2d.; and the "frett Seelinge" in the long gallery, together with the architrave frieze and cornice of the King's bed-chamber cost 48*l.* 10s. 1d.

Allow me one more reference to contemporary letters, which I believe have never been published, but which throw a very interesting light upon the building of one of the typical houses of a great building era. This letter is from Thomas Wilson to Lord Salisbury, and it deals with the proposed arrangement of the ornamental waters. Wilson writes on the 25th September, 1611, that he has been to Hatfield with "the frenchman,"—

"Whose purpose is to make a newe conserve d'eau (as he cals it) att the corner of the bowling place next the upper part of the est garden, wch shall conteyne all the water of the source as well the wast as the rest, soe that all the cesternes that now are wilbe of noe use unless your lop will lyke to have the great open cesterne in the garden to putt fish into to be redy upon all occations. The great store cestern in the ryding cort he would have taken downe and the materialls imployed in that he meaneth to make. This cesterne he will make will cost as he saith 300li besydes the materialls of the old one, and 100li more the bringing home of all the water and torning the pypes to serve the use of the offices in the howse as nowe they doe."

After further particulars, he goes on to say that the French Queen's gardener had come to him bringing over some fruit trees, 2,000 for the King, and 500 for Lord Salisbury, he wants a man the next morning to superintend the removal of them from the Tower Wharf, and Wilson asks for a reply that evening, "as the frenchman expects it from me early to morrowe morninge." He was suffering from the toothache it seems, and he ends by saying, "other things concerning Hattfield I deferr untill your lop have leysure and I helth to relate by word."*

We have now watched the building of the house from the time the site was in discussion. You may perhaps ask, Who was the architect? To this no definite reply can be given. There is no plan in Thorpe's book, and we hear of no one engaged on the work beyond those already mentioned; and it may be that with their help and with hints from his building friends, the Earl managed the work himself.

The house as it stands is a fine specimen of its kind. The plan is a square flat U, *i.e.* it consists of a long main range with two wings, one devoted chiefly to the servants, the other to the family. Much of the detail is very plain, the principal elaboration being reserved for the garden front. Certain changes have necessarily been wrought by lapse of time. The arcade under the long gallery was originally open, but has been filled in with pierced stone work and glass, to the increased comfort of the house inside, if to its detriment outside. Early in this century the whole place underwent extensive repairs, and in 1835 a lamentable fire occurred by which a part of the west wing was destroyed, but it was rebuilt, we are told, in exact accordance with the original design. Of the rooms inside the most interesting are the Hall, with its elaborate screens bearing the arms of the founder's son and daughter; the long gallery with the "frett seelinge" and panelled walls, the main staircase, with much heraldic carving, and a curious wicket gate, said to be intended to prevent dogs going up into the state apartments; the library with a chimney-piece bearing a mosaic portrait of the founder and the date 1608, the great chamber or King James's room, and the interesting chapel, with its stained glass of the period. Of course in a house which is inhabited by people who naturally expect the greatest amount of comfort which the age affords, it must inevitably happen that old arrangements must give place to new, old fittings and furniture must gradually disappear as they get shabby and decayed. The

* State Papers. Domestic. James I., Vol. 27. No. 7.
† The united wisdom of this illustrious party pitched upon a spot which necessitated the removal of most of the old palace, but the rest was preserved, and may be seen to-day.

* State Papers.—Domestic. James I., Vol. 45, No. 69.
† *Ibid.*, Vol. 53, No. 65. ‡ *Ibid.*, No. 79.
§ *Ibid.*, No. 82. ‖ *Ibid.*, Vol. 58, No. 9.
¶ *Ibid.*, Vol. 65, No. 3.

* State Papers.—Domestic. James I., Vol. 67, No. 62.

consequence is that there is not a great deal of the original work left inside the house, and what there is shows signs of having been repaired and renewed in many places. Thus the screens in the Hall show much new work. The chimney-piece, which Mr. Robinson says had over it the arms of Lord Burghley and the date 1575, is gone; so are the heads of the Cæsars in the ceiling, and the organ and organ-case which used to be in the gallery. Nevertheless, there is a fair amount of interesting detail, while the house outside retains its original appearance very completely. There you may still see the date 1611, and the arms of the founder on the south front. On the wings are the heads of iron tie-bars, fashioned into the initials R. S.—for Robert Salisbury. The pedestals of the front of the gallery up to which the masons had got on the 8th Nov., 1610, remain as they were left. The spout heads are dated many of them in the 17th century. There, too, are the towers, the roofs of which had been leaded, but not yet soldered, on the same 8th Nov., and we and all lovers of architecture must always echo Robert Liminge's words, "I thank God the maine building standeth firme and sure in every place."

THE BRITISH ARCHÆOLOGICAL ASSOCIATION AT GLASGOW.

WE this week bring to a conclusion our special account of the Glasgow Congress of the British Archæological Association.*

On Sunday, Sept. 2, a sermon was preached at the Cathedral to the members, by the Rev. Dr. Burns, the building being crowded in every available part.

Monday, the 3rd, was devoted to a survey of the Antonine Wall, and to a brief inspection of the ruins of Linlithgow Palace. On the arrival of the members at Bonnybridge Station a visit was paid to Elf Hill, an outpost work of the great barrier on its inner side. It consists of a well-defined mound, commanding an extensive view; but nothing is visible of foundations or earthworks. Here the Rev. Dr. Russell, proprietor of the estate, read a paper on the site and its probable connection with other fortified spots within sight. On leaving, the visitors proceeded along the Roman wall itself, the earthen mounds and the fosse outside them being well defined, the latter being deep and wide. The whole is in this district overgrown with wood and bracken, impossible of passage by so large a party had not Dr. Russell prepared a way by cutting a path through the entire extent of his property traversed. Passing over *Achnabuth*-tent field, Rough Castle at last was reached, after a long walk upon the wall, the condition of the land well justifying Dr. Russell's remark that it was all virgin ground, untouched since the Romans left it, either by ploughshare or railway. The great barrier extends in an all but perfect condition from Elf Hill to beyond Rough Castle, the only difference being that the fosse is somewhat filled up by the decay of the underwood of so many centuries. Its over-grown condition alone prevents its imposing proportions from being seen at first sight. Rough Castle is one of the military posts erected at intervals along the line of the wall. It stands on the summit of a steep bank, rising from a small streamlet strongly impregnated with iron, and its earthen banks are to be traced almost throughout their entire course. The plan is that of a camp of two compartments, but the wooded nature of the ground prevents perfect observation. Carriages being in waiting, the party drove to Bantaskine House, a modern building, where ex-Provost Wilson gave them an unexpected and hearty welcome, refreshments being set out on the lawn around the mansion. A fine section of the wall, cleared of growth of plants and well turfed, exists in the grounds, affording a capital example of what the wall must have been along its entire course. As a rule it occupies high ground. Beyond the wall was the City of Camelon, the site of which, now bare and level, affords an admirable position for excavation, since its existence, in country generally supposed to have been abandoned to the unconquered Caledonians, would most probably afford evidences of much value bearing upon a little-known page of early Scottish history. The site is marked on the Ordnance maps as an area of considerable size.

Carriages being resumed, after hearty thanks had been tendered to their host, the town of Falkirk was reached. Here, Mr. J. Riddoch M'Luckie, who had previously pointed out many interesting features of the Antonine Wall, gave to each of the party a printed résumé of his remarks, and of others relating to the ancient town of Falkirk. The church is a modern fabric, filled with galleries and pews as is the way of Scotch churches; but the old tower, once central, still remains as a porch to the present fabric erected on one side of it. It has been, however, so repaired that no traces of its antiquity occur at first sight. A plan of the old cruciform church, drawn by John Shaw, jun., 1788, the property of the Session, was exhibited. It shows that the former church was built with its corners singularly out of a right angle. Several old effigies, more or less mutilated, are preserved in the tower. The graves of several Scottish worthies in the churchyard were inspected, as well as a handsome cross erected by the Marquis of Bute to the memory of the men of Bute who fell at the first battle of Falkirk. At the adjacent Town-hall luncheon was partaken of, on the invitation of the Provost and Magistrates. Progress was then made through the beautiful park of Callendar House, which was opened for the occasion, past the mansion, a building of old foundation, but the front is modernised.

Linlithgow was reached too late for justice to be done to the remains of the Palace, or to the architecture of the parish church adjacent to it. The Palace is a roofless ruin, as it has been since it was burnt by the English troops after the rebellion of 1745. The masonry of this beautiful building stands well the ordeal of exposure to the elements, as all old Scotch stonework appears to do, but it was not with feelings of satisfaction that the members found many signs of decay, and noticed the neglected state of so interesting and important a building, in which so many events of Scottish history have been enacted. The church is of large size, and a fine example of late Gothic work. It has a western tower, now deprived of its steeple, of four open arches, but it is otherwise in capital structural condition.

At the evening meeting the following papers were read, the chair being occupied by Mr. Thomas Blashill, Superintending Architect to the Metropolitan Board of Works:—1. "Notes on a Diary by one of the suite of the Duke of York, afterwards James II., under date of 1679, on the journey from London to Scotland," by Mr. Geo. R. Wright, F.S.A. This paper was interesting in showing that a journey which can now be accomplished in nine hours then took royalty, with all the facilities of the time at command, as many days. 2. "The Classification and Geographical Distribution of early Christian inscribed Stones in Scotland," by Mr. J. Romilly Allen, F.S.A. Scot. In the author's absence his paper was read by Mr. W. de Gray Birch, F.S.A., one of the Honorary Secretaries. 3. "The Characteristics of Ancient Scottish Architecture," by Mr. E. P. Loftus Brock, F.S.A.

The following is a summary of Mr. Allen's paper. It commenced by showing that there was a pressing want for an antiquarian survey of England and the adjacent countries included in Great Britain and Ireland, in which every trace of the work of man in early times should be recorded. The archæologist of to-day was in the position of a geologist in the days when no maps were in existence showing the extent and course of the various rocks. He wished that such a survey had preceded the Ancient Monuments Bill, for it was of more importance that such a permanent record should be in existence. The destruction of ancient monuments was always to be deplored, but the loss was not so irreparable when they had been measured and photographed. No class of our national antiquities were so deserving of being exhaustively surveyed as the early Christian sculptured stones; and he presented in his paper the results of his own investigations, in the hope that it might stimulate sufficient interest in the subject to lead to a fuller survey being undertaken either by the Government or by the combined effort of the different archæological societies. The characteristics by which they were enabled to classify the monuments were (1) the style of the lettering of the inscriptions; (2) the peculiarities of the ornament and figure sculpture, and (3) the shape and construction of the monument. The number of inscribed stones in Scotland was exceedingly small when compared with those in other parts of Great Britain. It was not easy to explain this, for Scotland possessed more sculptured monuments without lettering, ornamented in a similar way to the illuminated pages of the Hiberno-Saxon MSS., than were to be found in Ireland, Wales, or England, and the Scot had never been behind his neighbours in literary culture. Although there were comparatively few inscribed stones north of the Tweed, a large proportion of the monuments had symbols carved upon them the meaning of which was at present unknown. It might, perhaps, turn out eventually that the absence of inscriptions was explained by the presence of these symbols. They could only express their astonishment that when so much was to be learnt from this branch of research, so little care had been taken to collect or preserve the materials whence these precious "sermons in stones" were to be obtained.

The Characteristics of Ancient Scottish Architecture.

Mr. Brock, in his paper on this subject, remarked that Scottish architecture, so far as was included within historic times, might be divided into three broad divisions—the works of the ancient Christian days; of those in Romanesque and Pointed styles; and of those erected since the introduction of the Renaissance or Italian taste. They might confine their attention to the two first. Of the first it might be briefly said that the works were similar to the contemporary ones of Ireland, from which, without doubt, their style was introduced. The ornamentation was similar to what was now found upon so large a number of crosses and slabs in Wales, Cornwall, and in many other parts of England, all in like manner derived from the art of the native Church in early times. There were many small churches and oratories still remaining, and still many more which, although of later date, resembled them in many particulars. These, like the other fabrics of the early Church in our isles, were square-ended, and fairly well orientated, there being, however, this peculiarity, which was not noticed, or not to so great a degree, in English works—that there were many early churches which were many degrees out of east and west. There were also many of which the angles and not the fronts were nearly towards the cardinal points, in this respect resembling the great church of Sta. Sophia at Constantinople. Thus, among many others, the following might be noted at random:—St. Giles's, Edinburgh; Duddingston, Ratho, Corstorphine, Seton, Dunglass, Linlithgow, Dalmeny, Kirkliston, Douglas, and many others not only in the home counties, but in the isles. Of all the churches of which plans were given in Muir's "Notes," only four were due east and west, or nearly so. Of all those named in the "Ancient Parochial Churches," only a single example was due east. Had shorter buildings ever stood on those sites on the same axis,—and the axis was seldom changed,—their angles and not the faces would have been to the cardinal points. These features of the earliest of Scottish churches were of no little interest to the ecclesiological student, for they appeared so opposite to the arrangements of the churches of Italy, where no rule of orientation had been observed at any time either early or late, and where the churches faced in any and every direction. As the churches of Scotland were founded, so did they continue. The past was found in the present to this day in that respect. Thus Glasgow Cathedral, rebuilt over and over again, without one stone remaining of the earlier churches, yet showed a square east end, and also in the axis of the present lengthy structure a great divergence from true orientation. It derived that from probably the earliest fabric erected on the site, the angles of which, and not the faces, would have been more truly in the direction of the cardinal points. The Mediæval works of Scotland claimed their largest attention. They were of the highest order of merit as regarded artistic design and feeling. The Romanesque style was found in perfection later than in England, but the examples which remained were richer architecturally. They had some sculpture, but the effect was produced by architectural features more entirely than across the Border. Dalmeny and Leuchars were examples. While the plan was but an enlargement of such churches as Kilpeck,—what Shrobden was,—Barfreston and many others, yet in all these the sculptured ornamentation was more apparent than in Scotland. It was in churches of this age that apses were found, but they disappeared only to occur again, as they also did in England for a short time and in a few instances, angular in form and not semi-circular, towards the end of the

* See *Builder*, pp. 154, 173, *ante*.

fifteenth century. The church of Linlithgow afforded a very good example. The First Pointed style was found with many combinations of Romanesque features, and the stage of transition continued for a much longer period than in English or French work. The style had produced some of the most beautiful works that Scotland possessed. Arbroath and Kilwinning Abbeys, St. Andrew's and Elgin Cathedrals, and Holyrood Chapel, afforded perfect specimens of purity of design and beauty of execution that had never been surpassed in any other country, even in structures of much larger size. These works had been said sometimes to resemble English and sometimes French churches. They did neither. They were designed in a more compact manner than in England, they were taller in proportion to their width; their parts were smaller and more united to the adjoining ones, and had been studied more in relation to the parts that came next to them. While it was true that the plain, flat soffits of the porches of Laon Cathedral were found also at Arbroath, yet, while there were certain resemblances, there were many features in French work that never appeared in Scotland, and many Scottish features that were not to be found in France. Indicating some few features which bore testimony to the statements made, he observed that the west doorway at Elgin and others were divided into two, following the usual French arrangement, but there were mouldings and carved foliage only. There was not a single example in the richest doorway in Scotland of any sculptural figures in niches such as formed so conspicuous a feature in French work. French spires of early date were often highly pointed. There was no example in Scotland of an acute angle. Flying buttresses were common in France, in Scotland rare. Apses were usual in the one country, absent in the other. Forms once adopted in Scotland had remarkable vitality. Thus, for instance, round-headed arches appeared in early work. They remained through the whole Gothic period, being found in the latest Gothic works, adorned with all the mouldings and carvings of that period; and indeed they continued until the old architecture was lost in the modern. The Norman west doorway at Jedburgh had a pretty arrangement of a large angular canopy and two smaller ones, probably an addition to the doorway. There was nothing exactly like it in England, and it was certainly Scottish rather than French. It appeared again at Elgin. Something very like it was found again on an early seventeenth century entrance at Ochiltree Castle. One of the most remarkable features of Scottish architecture, and one in which it greatly differed from either English or French, was that there were but two Pointed styles, and not three. What was known as the Perpendicular style in England did not appear in Scotland. In its place there was the continuance of second Pointed forms, with certain variations in the design of the window tracery, at first not a little perplexing to the student. The beginning of the style had all the features of their own Geometrical work, with some stiffness in design. Of this, Glasgow Cathedral, in its choir and also in the nave, afforded the largest and one of the best examples. The progress of the design could be traced to the first incipient example of open tracery, three lancets contained within a single window—a design not overgraceful, but very common. The Church of St. Monance, erected about 1369, had, with far more solidity of form so far as regarded the structure, all the features of their own flowing Decorated style as regarded the patterns of the windows. The apse of Linlithgow and the east window of Melrose had certain upright lines in the tracery not unlike their Perpendicular style, and so far and no more there might be a certain Dunblane itself had flowing Decorated windows beside, and of the same date as that which resemblance. Yet the College Chapel of Aberdeen, erected about 1494, had flowing Decorated tracery enclosed within a semicircular arch; and at Melrose the same thing might be observed to a far greater degree. Dunkeld Cathedral had also many beautiful windows of flowing Decorated style in the nave, dating from 1406 to 1450. Iona Cathedral was of peculiarly early form, but its ornamentation was late. Corstorphine Church, founded in 1429, was also very early in appearance, but very late and curious in all its features. It was stone-roofed, showing an elaboration and a continuance of the form of roofing of the earliest oratories. Crichton Church was another early-looking church with a low tower, having the peculiar Scottish feature of a parapet walk round it and a saddle-backed roof. Its windows had flowing tracery, but it was only founded in 1449. The design of the window-tracery was infinite in its forms, and all of very great beauty—in some examples similar to English patterns, in some to French ones. He did not agree with the statements made with respect to these windows being Flamboyant in design pure and simple. There was nothing but what any school of artists would work out for themselves, and a single man of genius would have had individuality enough to introduce the use of such a feature as that to any style. Scottish work was full of such signs of personal design; and Roslin Chapel might be cited as the design of one mind following upon contemporary work. It was neither foreign nor English. Its lace-work patterns here and there might find a counterpart in some Belgian work, its heavy-pointed vault might find a better one in many a Scottish castle, but the 'Prentice Pillar and the general conception was nothing if it was not of individual design. The same might be said of the adaptation of the beautiful and peculiar crown on the steeple of St. Giles's, Edinburgh, also at Aberdeen College and Glasgow Tolbooth, and formerly at Linlithgow and Haddington. He proceeded to show how the old Scottish architecture differed from the contemporary work both of England and France, and to assert its claim to be considered a national school of art. In closing, he pointed out the pressing need for attention being directed to preserve all that was left of these works, of which, he said, the ancient nation might well be proud.

Dr. Rowand Anderson expressed a hope that Mr. Brock's paper would lead to excellent results. He was glad to find that Mr. Brock combated the feeling that had prevailed so absurdly in many writers on the subject, that Scotland was indebted almost entirely to the French for their architecture. That was not so. The Scots were indebted to themselves; but he was not altogether inclined to go the length of Mr. Brock, and say that their architecture was solely and exclusively Scottish. As far as his knowledge went, he thought that up to the War of Independence, after the death of King Alexander III., the ecclesiastical and castellated architecture of Scotland ran on parallel lines with that of England. He admitted at once that there were many distinctive features to be found in Scotland that were not seen in England. But, on the other hand, he did not think that the features in Scotland showed so great differences as were to be found between different districts in England. All over the country architecture was practically the same as a language, in that it was to be found in different districts in different dialects. Undoubtedly after the War of Independence, when the communication between Scotland and the south was practically cut off, Scotland developed a style of architecture which was very strongly marked, and only to be found there. He could see very few traces of the French in that architecture. Mr. Brock ascribed the great absence of churches in Scotland to the rebuildings which had taken place, and no doubt that was so, but the area of parishes in Scotland was greater than in England, and therefore the number of churches would be fewer in Scotland than in England. Mr. Brock's appeal on behalf of the preservation of their national monuments would, he hoped, effect some good. There was no doubt that throughout the length and breadth of Scotland their monuments of architecture had been sadly neglected, both by individuals and by the State. As far as individuals were concerned, much good had been done of late years. The splendid example set by the Duke of Argyll, who some years ago spent a large sum of money on the island of Iona; of Lord Lothian, who gave of his means liberally towards Jedburgh; of the Earl of Home, who so actively interested himself in the old church at Douglas, in Lanarkshire; and what they saw so well and generously done at Doune Castle by Lord Moray, indicated a most excellent spirit, which he hoped would continue to spread. As far as the State was concerned, he was sorry he could not point to any great hope of much being done. He trusted that the visit of the Association to Scotland would be the means of rousing up a thorough spirit of interest in these buildings. Scotland was full of most interesting remains; they were surrounded by a halo of history that was to be found nowhere else, and they could not afford to lose them.

Mr. Ewan Christian remarked that the influence of the French might be distinctly seen in the architecture of Stirling Castle and church. He was very much interested in what he saw at Paisley the other day, as he did not know they had anything so fine close at hand. In some of the Paisley works there were a vigour and power which were delightful. It was to be hoped that researches would be continued in Scottish archæology.

Professor Hayter Lewis, F.S.A., was very much surprised on going to Stirling to find the neglected state of that most interesting castle. The old chapel was now a store-room, and there was not a particle of the old castle used as it ought to be. One could hardly speak too strongly of the absolute necessity of making representations to the Government, and he hoped they would be able to devise a memorial on the subject.

Mr. W. Black, F.S.A.Scot., Local Congress Secretary, did not think there were so few parish churches in Scotland as one was at first inclined to believe. The history of many of those churches was to be found in the law reports, as those in ecclesiastical circles were extremely litigious. It seemed to him that the much-decried Reformation had had less to do with the destruction of churches than the placing of the duty of maintaining them upon the shoulders of the heritors of the parish.

Mr. Brock, replying to the discussion, corroborated Dr. Anderson's remarks regarding what he had termed the different dialects of architecture. It had frequently been his lot to point out to his colleagues the differences that were to be found in Devon or Cornwall and Norfolk, or between Wales and England. He was quite in accord with Dr. Anderson with respect to what ought to be done by the Government. He hoped that one outcome of the Congress would be an urgent representation to them with regard to the condition of Scottish historical buildings. They were buildings which, if allowed to fall into decay, would be lost to the country, and would be the cause of much reproach. If, on the other hand, there was any truth in the old proverb, "A stitch in time saves nine," it was true in regard to the architectural monuments of Scotland. Stirling Castle was full of disfigurements and defilements which ought not to have been thrust upon one of the most important castellated buildings in Scotland. In conclusion, he called attention to the condition of Linlithgow Palace. He had descended to the basement when visiting the building that day, and found water, probably the showers of the three days previous, percolating through the roof of the vaults. The building was also otherwise neglected, and common sense and common knowledge told them that it could not exist in the state in which it was at present without harm accruing.

The concluding day of the Congress, Tuesday, September 4, was devoted to a visit to Dunfermline, and to the reading of various papers, for which there had not been time at the previous evening meetings. A day of brilliant sunshine, after others more or less gloomy, was very welcome to the somewhat lessened but still large gathering. Dunfermline was reached about half-past ten, and the party was met by Provost Donald, with various members of the municipality. After being driven through the public park and some of the principal streets, they assembled in the Council Hall, where they were joined by Sir Arthur Halket, Sheriff Gillespie, the Rev. Mr. Stevenson, and many others, members of the School Board, and some of the gentry of the district. The Provost gave a cordial welcome to the archæologists, and called upon Mr. Geo. Robertson, F.S.A. Scot., Custodian of the Property of the Crown in Dunfermline, to read a paper descriptive of the rise and progress of the ancient borough, and of its many objects of antiquity.

Mr. Robertson referred to the etymology of the name *Dun-fiar-linne*,—the castle by the crooked stream,—and spoke of the Castle of King Malcolm Canmore, a fragment of which still remains not far from the Abbey, and which appears in the arms of the town. The celebrated Abbey was founded about 1075 by King Malcolm, at the request of his Queen Margaret. The eastern portion of the church was rebuilt about 1250, and the Abbey buildings were of still later date. Under Mr. Robertson's guidance the party proceed to inspect the objects which he had described, and the first halt was made within the nave of the Abbey church, which still remains intact, the massive pillars and round arches being very good Norman

work, while the western portal is a remarkable enriched specimen. The eastern portion of the fabric has disappeared, and on its site is a modern cruciform church, joined on to the spacious nave, which only forms a vestibule to it. The central tower of the new church stands exactly over the spot where the grave of Robert Bruce was found in erecting it, and the King's title is carved in large open-work letters in the parapet of the tower, but the spot internally is not visible, since it is covered by the pulpit, an unsatisfactory state of things which called forth remark from one of the members. It is satisfactory to know that a project is on foot to erect a monument over the spot, and to set back the pulpit from its present position. Mr. Robertson then led the party to the tomb of Queen Margaret, which still remains at the extreme east end, enclosed within the walls of the Lady Chapel, which are 3 or 4 ft. only in height. The walls show the bases of what must have been a very elaborate arcading around them. The tomb consists of massive blocks of marble, full of large fossils; and, although now in the open air, it is solid and perfect, but its canopy of columns and arches have long since been destroyed. The enclosure has been railed around by the Government. Mr. Robertson then pointed out the remains of the spacious refectory of the Abbey, built on high ground above the stream, and afterwards the ruins of the Palace of the Kings of Scotland, adjoining to the Abbey, and connected to the refectory by an arched passage. The portions remaining show traces of Norman masonry, very much altered by the insertion of large later windows. A fine vaulted crypt remains. Progress was then made to the fragments of Malcolm Canmore's tower, which consist of only a few portions of walling of a date more recent than the time of King Malcolm, but erected upon a bold circular mound, which, with a long narrow inclined path leading to it, are of much older date than the masonry. The spot is one of great beauty and of great strength, the banks descending in precipices to the stream far beneath.

By invitation of the provost and magistrates, luncheon was partaken of, after which the party returned by train to Glasgow to attend the closing meeting in the Corporation Galleries. This was held at half-past four o'clock, Archbishop Eyre, D.D., presiding for the commencement of the proceeding, but afterwards the Marquis of Bute. Various papers were read, including two by Professor Ferguson, the first being on the Literature of Witchcraft in Scotland, and the second upon "Kirani Kiranides," a book of seventeenth-century date, containing magical receipts, a work of great rarity, supposed to have been written by a Persian king.

These were followed by a paper by Mr. W. G. Black, F.S.A.Scot., Hon. Local Secretary, on the Derivation of the Name of Glasgow. Following Professor Rhys, he considered that the name meant *Glas chu*, or "the greyhound," He was followed by Mr. W. de Gray Birch, F.S.A., who read a paper on the "Materials for a Scoti-Monasticon." He passed in review the various old records still in existence, particularly those in the British Museum, and also the more modern writers who have treated of the old monasteries of Scotland.

On the motion of the President, votes of thanks were passed to the Lord Provost, the provosts of the various towns, the officer commanding at Stirling Castle, and all the other public and private gentlemen who have helped the Congress. The proceedings were brought to a close by the acknowledgment by the Marquis of Bute of thanks to himself.

In the evening a *conversazione* was held in the galleries of the Corporation by the Lord Provost and Magistrates of Glasgow, given to the members of the Association and those of the Library Association of the United Kingdom. The guests were received by Sir James King, Lady King, and the members of the municipality. The spacious galleries and their artistic contents were seen to great advantage by the company, about 600 in number, the Marquis of Bute and the Marchioness being present.

The Congress thus concluded has been attended by numbers of the members and their friends much in excess of what is usual at such gatherings. The proceedings have been followed with apparent interest by the people of the various localities visited, and by the Press; and it is to be hoped that the amount of attention directed to the ancient remains of the land will be conducive of good permanent results. Hospitality has been shown to the members profusely in every direction. The weather has been at some times cloudy, and at others worse, but it has never been unpropitious enough to interfere with the carrying out of the programme, and when the sun has shone the magnificent scenery traversed has been seen to great advantage.

The meeting has been remarkable for the number of architects who have attended it, among whom were Messrs. Ewan Christian, A, Cates, T. Blashill, E. G. Paley, of Lancaster, J. Honeyman, of Glasgow, Loftus Brock, Dr. R. Anderson, of Edinburgh, Professor Hayter Lewis, and others.

THE METROPOLITAN BOARD OF WORKS INQUIRY COMMISSION:

FURTHER EVIDENCE.*

MR. W. A. LINDSAY, sworn and examined, said he had been a member of the Board since October, 1885. He represented Kensington, for which there were two other members. He did not become a member of the Board until substantially all the transactions into which the Commission had been inquiring had occurred. He was personally very strongly opposed to the practice of the Board in referring matters to committees sitting in private with power to act, because, while he did not imagine that there was a clique on the Board desiring to carry out any corrupt practices, yet the practice of referring matters to committees with power to act would facilitate such cliquism if it existed. Witness was at first opposed to the dismissal of Robertson, because the report of the Committee disclosed no evidence against him. He did not say that the report of the Committee was a right one; but he took it as it stood, not being a member of the Committee himself.

Mr. J. Ebenezer Saunders, F.R.I.B.A., recalled and further examined by the Chairman, said he was desirous of making a further statement with regard to the evidence which some of the witnesses had given before the Commission. With regard to Mr. Isaacs's evidence, witness wished to deny that he caused any pressure to be put on Mr. Villiers so that he (witness) might become the architect of the London Pavilion. Villiers came to him as an ordinary client, and he was received as such. It was a matter of honour. Witness also wished to rebut the statement made by Mr. Isaacs, that Villiers was indignant at having an architect (the witness) thrust upon him who was not only incompetent to do the work, but too avaricious to spend the necessary money to employ competent assistants. Witness said that, looking at the course of his professional career for more than forty years, and at the buildings standing in all parts of the City carried out from his designs, and knowing the staff that he had in his office, he was bound to answer that, for his own professional reputation. The general public—and there were many who knew his professional standing,—would know the contrary. Witness believed that Mr. Woodward was in error in saying that he (witness) spoke about Messrs. Isaacs and Florence posing as architects for the Pavilion. Witness also denied Mr. Woodward's statement that at witness's suggestion he (Woodward) had an interview with Villiers, and reported the result to witness. Witness added that he had been many years in the profession, and he believed he had never done a dishonourable act, as that would have been. Witness was asked whether there was any objection to his acting as architect if Mr. Villiers wished him to do so. He said that there was not, and that he should feel it an honour if they were to be good buildings; but he said that as a member of the Board he could not vote on or take part in anything to do with Mr. Villiers's proposal. He did not add to that statement the remark that "there were more ways of killing a cat than hanging it." Witness wished also to be clearly understood to say that at the time he became architect for the London Pavilion, he knew nothing whatever of any relations between Villiers and Goddard or Robertson in reference to that site. He was prepared to swear that, to the best of his knowledge and recollection, he had no conversation with Robertson as to the corner plot of the site until an after-date. Did not know how it was that Robertson spoke to Mr. Woodward on the subject, and to Villiers. Nothing had passed between witness and Robertson, and he (witness) repudiated entirely the idea that he should have suggested,—he never had done such a thing, and he hoped he never might,—that there would be the slightest difficulty in passing anything at the Metropolitan Board unless he (witness) was the architect. With regard to Mr. Verity's evidence, witness said he saw Mr. Verity "continually" on the subject,—a great many more than three times,—but he had no record of them. He charged it all from his head afterwards. It was only a proper professional fee for that particular work. He advised upon the new entrances to the theatre. He was a member of the Theatres Sub-Committee of the Board, and it was that Sub-Committee which would afterwards have to deal with those plans; but it did not strike him as being in the slightest degree improper that he should accept a retainer to give professional advice under those circumstances, because, for the twenty-five years he was a member of the Board, he had always kept away or abstained from voting on matters as to which he had been professionally concerned. Moreover, whenever he had been professionally concerned, he had always mentioned it at the time, or intended to do so. Further questioned, witness admitted that he was present at a meeting of the Theatres Sub-Committee on one occasion when the matter in question came forward, and moved or seconded a resolution upon it. Would not swear that in that particular instance he mentioned that he was professionally interested. With regard to the payment to witness by Messrs. Spiers & Pond for work done in connexion with preparing plans for the proposed "Cock" Tavern, in Fleet-street, considerable services were performed for the money paid, which was not in any way regarded by him as payment for services rendered in connexion with the "Criterion." As to Mr. Earle Bird's statement that he paid witness 52*l.* 10s. for advice with regard to plans which were to come before the Board, witness said that the amount of his remuneration for that work was not discussed until four years later. The plans as to which he advised Mr. Bird had ultimately to come before the Building Act Committee of the Board for approval. Witness was at that time a member of the Building Act Committee, but he did not see anything questionable in acting professionally in a matter that was to come before the Committee. Asked whether he had not moved at the Board meeting the adoption of the recommendation of the Committee that Mr. Bird's application be granted, witness said that he found by the Board's minutes that he had moved it, but it was evidently done accidentally, in this way: He, as a former Chairman of the Building Act Committee, would, in the absence of the Chairman of the Committee, be asked to move the report, and, as was usual, a number of recommendations were moved together, or *en bloc*, unless any one objected. When he moved that batch of recommendations, he did not know that Mr. Bird's application was included. With regard to the evidence of Mr. Francis as to witness's share in the architectural supervision of the work at the Grand Hotel, witness said that it gave not only an inaccurate but a totally wrong view of the whole case. He (witness) was certainly at the building three times a fortnigh, if not twice a week. He continually met Messrs. Francis on the works, and at other times he was there alone. He denied that the plans were entirely prepared by the Messrs. Francis. The whole of the plans of the Grand Salle, and of the Salle à Manger (the secondary one) were all prepared in witness's office; all the other ground-plans and the elevations and the corner of that building were altered or re-designed by him—he meant, designed by himself and the drawings executed by his assistants, and not by Messrs. Francis. He was not prepared to swear that he did not know beforehand that if Messrs. Gordon obtained the site he was to be joint architect of the building with Messrs. Francis, but he concluded so. Mr. Gordon was a very old friend. Did not think that these circumstances would be likely to bias his view as a member of the Board as to whether Messrs. Gordon's tender for the site should be accepted. There was no possibility of one member influencing the whole Board. The Board were a great deal too sharp in serving the public to allow any one member to influence any letting, even if he had the will. Witness was sure he had not the will to do so. With regard to the plans for the Hôtel Métropole, a large number of them were prepared in his (witness's)

* For summary of previous evidence see the *Builder*, pp. 8, 44, 66, 83, 103, 124, 161, 179, *ante*; and last volume, pp. 434, 446, 466.

office, many of them as copies, after they had been arranged with Messrs. Francis,—the whole series of copies, in fact, which was not a small thing in work of that description; neither was the consultation as to alterations of different construction and different forms a small thing. All that work had to be done by witness, who attended at Mr. Gordon's offices, and Messrs. Francis were generally present as well, continually. Though he and Messrs. Francis both prepared different plans in the first instance, those plans were amalgamated. Mr. Francis's suggestion that his firm's design was the one chosen was inaccurate, because the ground story of the elevation was witness's, with certain modifications; while a great deal of witness's design was embodied in the upper part of the building. Witness also exercised very special and constant supervision of the work, especially the foundations, for Messrs. Gordon & Co. in this case were their own builders, hence the necessity for careful supervision, although they had their own clerk of works. Witness denied that there was anything in Mr. Woodward's evidence to the effect that witness had promised to advocate Mr. Villiers's claims as the applicant for the Pavilion site. As a member of the Board, he was constantly being appealed to by friends and brother professional men to give his support to applications in which he had no pecuniary interest whatever; to such applicants, whether for little or big things, he invariably said, "Tell me anything you have to say, and I will give it the calmest and most proper consideration when it comes before the Board." Mr. Woodward was an assistant in his (witness's) office at the time. Witness should consider it improper that he (witness) should act in compensation cases against the Board. Should not consider it proper, either, that he (witness) should take half the fees paid to his assistant for so acting. He believed that Mr. Woodward was thoroughly in error in his evidence on that point. Believed Woodward had the whole of the fees; certainly he (witness) never had half. Without saying that Mr. Woodward had given false testimony, he thought he was mistaken. Cross-examined by Mr. Studd, on behalf of the Inquiry Committee, witness said he was not aware that the London Pavilion projected 2 ft. 9 in. into Great Windmill-street. With regard to Mr. Whiteley's buildings at Bayswater, of which he (witness) was the architect, he did not suggest to the District Surveyor that all he need do was to report to the Board with regard to their alleged non-compliance with the requirements of the Building Act, and that he need not take any proceedings.

Mr. Frederick George Baker, Mr. W. J. Wetenhall, and Mr. W. Shepherd, all members of the Board, were next examined, the last-named gentleman very fully. Mr. Shepherd stated that he was a builder, and became a member of the Board in 1881. He had been a member of the Building Act Committee ever since. Except in very few instances, he was unaware that Mr. Saunders and Mr. Fowler had been advising with reference to plans that came before the Building Act Committee. Mr. George Hill, Mr. Henry Harben, two other members of the Board, were also examined.

Mr. Thomas Verity, recalled, repeated the evidence given by him on a former occasion as to the "Cock Tavern" and as to the "Criterion," and Mr. Saunders's connexion with both, and re-asserted its correctness.

Mr. E. C. Keevil having been examined as to certain suspicious circumstances which had come to his knowledge in connexion with the letting of Board sites, Mr. E. Dresser Rogers, C.C., Mr. John Tolhurst, Mr. John Jones, Mr. John Runtz, Mr. William Debenham, Mr. Alfred Ewin, Mr. G. P. Meaden, Mr. William Robson, Mr. J. E. Bradfield, Mr. T. J. White, Mr. Robert Furniss, Mr. John Abbott, Mr. George Brown, Mr. Robert Jolly, the Hon. A. de Tatton Egerton, Mr. E. R. Cook, Mr. G. B. Richardson (all members of the Board), and several other witnesses were called, including Mr. Hugo Wollheim and Col. A. S. Jones, V.C., who gave evidence with regard to the Board's treatment of suggestions for improving the condition of the Thames as affected by the metropolitan sewage. Mr. J. E. Saunders, Mr. W. R. Selway, Sir Joseph Bazalgette, Mr. Thos. Blashill, and other witnesses were also recalled. Mr. Arthur Gunn, the Accountant of the Board, gave a very clear and lucid statement of the method of keeping the Board's accounts.

In adjourning the inquiry *sine die*, from its twenty-fourth sitting (held on August 14), the Chairman of the Commission (Lord Herschell) said:—"The Commission, having taken all the evidence which appeared to them material which is at present available, propose now adjourning *sine die*. Before adjourning, the Commission desire to thank all who have assisted them in their inquiry. They would especially express their obligations to the solicitors to the Inquiry Committee for the care with which they have investigated some of the many communications which the Commissioners have received. They desire also to state that they have received from the Metropolitan Board all the information, documentary and otherwise, which they have called for, and that this information has been readily supplied, and without delay."

We believe that the Preliminary Report of the Commission may be expected about the beginning of November.

Illustrations.

CHURCH OF SS. PETER AND SWITHUN, WINCHESTER.

THIS church is about to be erected to take the place of the small chapel erected at the end of the last century by Dr. Milner, the well-known antiquarian and historian of Winchester, but which is now quite inadequate to the present requirements. Owing to its interest, however, the greater part will be preserved as a confraternity chapel attached to the new church. This latter, owing to the rapid fall in the ground at the east end, will have a crypt under the chancel, with boys' sacristy, heating chamber, &c., in connexion. There will be a descent into the church at the west end, in order to increase the internal height. The tower in its lower story will contain a chapel, while above this will be the organ chamber, opening into the upper wall of chancel. The style adopted is transition from Decorated to Perpendicular, and the materials used will be flint and stone externally, with tile roofs, while internally Beer stone will be mainly employed. The architect is Mr. Frederick. A. Walters, F.S.A.

TOWER OF SAN MINIATO, FLORENCE.

SAN MINIATO is one of the most perfect and interesting examples of the Romanesque in North Italy. It is of admirable proportions, consisting of a nave and aisles, and dates from the early part of the eleventh century. The windows of the apse shown in the sketch are filled in with semi-transparent slabs of marble giving in the interior a beautiful effect. The Campanile was restored at the commencement of the sixteenth century. F. T. V.

THE THIERGÄRTNER-THOR, NUREMBERG.

THE Thiergärtner-Thor, on the south side of the Castle, is one of the many towers of various shapes at intervals on the fortifications. The latter forms one of the most interesting features of the town, consisting of a rampart encircling the city, and still in fair preservation, though some parts have recently been removed.

F. T. V.

HULL AND SCULCOATES DISPENSARY.

NEW PREMISES, BAKER-STREET, HULL.

THIS building includes a dispensary and a residence for the house surgeon, which are quite distinct, communicating only by a double doorway between the waiting-hall of the dispensary and the staircase hall of the house. The dispensary proper is entered by a doorway in the centre of the street frontage, from which a short passage leads to the waiting-hall, a lofty room 25 ft. by 23 ft., lighted by windows high in the walls, above the surrounding buildings; the seats will be arranged so that patients requiring advice and medicine are separated from those requiring medicine only. Behind the waiting-hall is the consulting-room, with separate doors for entrance and exit, and a dispenser's-room or surgery, with hatch opening into the hall, and with drug store attached. The Board-room is immediately to the left of the entrance, with a frontage to the street. The house surgeon's residence is entered by a side doorway, and occupies most of the frontage; it includes dining-room, kitchen, and the usual offices on the ground-floor; drawing-room, two bedrooms, bath-room, &c., on the first floor, and two bedrooms on the second floor. The materials used are red brick, with dressings of Ancaster stone, the roofs being covered with Broseley tiles. Messrs. Botterill, Son, & Bilson, of Hull, are the architects, their design having been selected from four submitted in limited competition. The work is being carried out by Mr. F. Blackburn, of Hull, at a total cost of about 1,900*l*.

ANCIENT STONE CROSS FOUND AT GLOUCESTER.

THE following letter explains the origin of this interesting relic, of which we give an illustration from a photograph forwarded to us by Mr. Medland:—

SIR,—In a recent number of the *Builder* you gave extracts from a paper on St. Oswald's Priory at Gloucester, read by me at the late meeting of the Bristol and Gloucestershire Archæological Society.

One of the principal points of interest in that paper was a description of part of an ancient stone cross which was recently removed from a garden wall in the vicinity of the remains of the Priory. I send you photographs of the stone with the hope that those who have made these ancient stones a special study may be enabled to fix the date and origin of the stone, and suggest the symbolical meaning (if any) of the carvings thereon.

The following notes and suggestions may help to elucidate its history:—

Tradition ascribes the foundation of St. Oswald's Priory at Gloucester to Merval,—the third son of Penda,—and Domneva his wife, about 660.

Oswald was killed in battle by Penda in 642. When young he lived with, and under the protection of, the Monks of Iona, and through their teaching he embraced Christianity. On his recovery of his kingdom (Northumbria) in 634, he founded a monastery at Lindisfarne, and placed there, as its head, Aidan, one of the monks of Iona.

The stone is of oolitic limestone from the Cotswold Hills, near Gloucester. May it not be that the monks of Iona, or Lindisfarne, sent a skilled artificer to carve and erect this elaborate cross to the memory of their great friend and patron at the monastery then recently founded at Gloucester to his honour?

HENRY MEDLAND.

Gloucester, *August* 20th, 1888.

OLD COTTAGE ARCHITECTURE.—V.

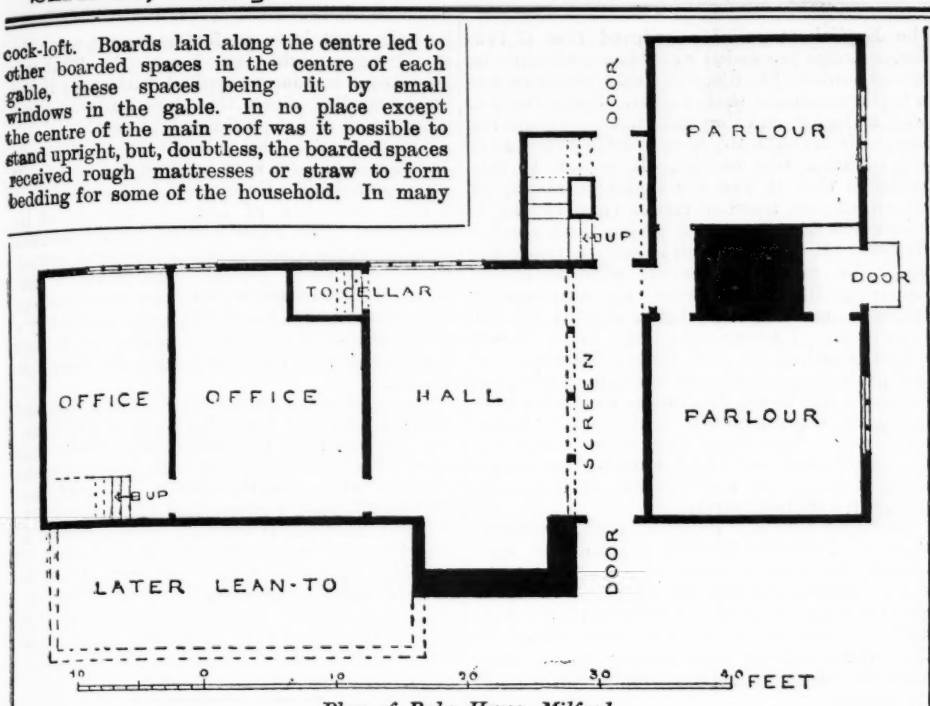
As I have said before, the normal plan of the better house consisted, as described by Mr. Baily, of a central hall with a passage cut off by an open screen, and of kitchen and offices leading from this passage and private rooms on the other side of the hall. In this plan the outside usually took the form of a central hall and gables each side. There is, however, a smaller type, perhaps rather later in date, and of the end of the sixteenth century, in which the plan is of an L or T shape.

The offices in this case are smaller, and it is probable that what was the hall in older houses became the kitchen. At this period the halls ceased to be used as the gathering-place of the whole family and domestics, and we commonly find the old open-roofed halls divided by floors into two or more stories.

I give a plan of Rake House, Milford, of which I gave outside views in my first number of this series (see *Builder*, July 7 last).

The plan is of the original house, as far as I could make it out when restoring it. It had been but little altered, and will serve unusually well as a type of this class of house. The windows on ground floor, except some to offices, are later in date, and the only door that can be positively spoken of as original is that to the small building containing the stairs. As there is no sign of any fireplace in the offices, it is probable that the hall was the kitchen. One parlour is panelled, and has a fine carved mantelpiece, dated 1602, and the other parlour is half-panelled, the top being doubtless originally covered with tapestry. There was the usual state-room upstairs, which probably served as a drawing-room, and in this case had a very fine mantelpiece and panelling. This has in the re-arrangement been brought downstairs. The staircase in the offices was one of those cut out of solid oak, and led to a small room over the end office; and other stairs, probably replacing a ladder, led from the landing into the roof. This was a good example of what was called the

cock-loft. Boards laid along the centre led to other boarded spaces in the centre of each gable, these spaces being lit by small windows in the gable. In no place except the centre of the main roof was it possible to stand upright, but, doubtless, the boarded spaces received rough mattresses or straw to form bedding for some of the household. In many



Plan of Rake House, Milford.

of the cottages I have drawn are similar lofts, but of still smaller size. I have no doubt whatever these were commonly used for sleeping-rooms, though at later date they have sometimes been turned into apple-stores and to other uses. In large houses one often finds that the top story, though only partly in the roof and provided with fireplaces, has the roof-timbers unceiled, and nothing but the tiles between the outer air and the room.

At Rake, stone steps led to a cellar containing a well of clear spring water.

The fireplaces had brick Tudor arches, and in the bedrooms over the parlours the sides of these were coated with a very thin coat of hair plaster, on which were painted arabesques in distemper colour. The drawing was of a rude character, and too far gone to be preserved. In this plan the private rooms are on the reverse side of the passage to that usual at an earlier date, owing doubtless to the altered use of the hall. The stairs are somewhat unusual, the newels not showing, but being filled in with plastering, and ending above the first floor with a table top, a rather picturesque arrangement.

The illustrations given this week are mainly close to the village of Shiere. There are many interesting old cottages here coming down from Elizabethan times, when Shiere and Abinger were actively engaged in the cloth trade, for which Guildford and Godalming were centres. Few, however, of these cottages are of sufficient architectural character for me to illustrate, though there are several carved barge-boards and good chimneys. The chimney shown to the Shiere illustration is, I think, the stoutest I ever saw, the shaft being, according to the bricks, 3 ft. 9 in. in the square.

The timber house at Gomshall is of very good character, and it is a pity it has not fallen into hands by which it would be treated with the care and attention it well merits. As it is, what has been done to it is unfortunately out of character. The timber pattern is of circles, as at Bramley and Tangley Manor.

The old house at Paddington has a very good carved barge-board, and the front of the nearer gable, at least, is doubtless of good timber-work, though the whole is hidden by a thick coat of rough cast. This is unfortunately the case also with Nursecombe and the front of Plunk's farm, Shamley-green, which, from the character of the carved barge-boards and the mouldings, both have, without doubt, fronts of good character. As that at Nursecombe faces south, it is doubtless very much perished; but the other two, facing east and north, are almost certain to be in good condition, and it is a great pity their owners will not go to the trifling cost of exposing them to view.

The range of cottages at Abinger-Hammer I have shown, because it is an example very well-known to painters as being particularly picturesque, and is therefore a good example of what I have already pointed out, how little "architecture" is required for this class of building. Part of the roofing here, as elsewhere in the neighbourhood, is of stone slate.

I have been told that some of my examples are not "architecture" at all but "barns." It is precisely the importance of perfectly simple treatment of simple buildings that I want to enforce by the exhibition of old examples, the picturesqueness of which as compared with modern efforts is universally admitted.

The chief feature of a cottage must always be the roof and it is the treatment of this that is all important. Examination of my examples will generally show, besides the general effect, some little particular mode of treatment worthy of study. Another particular feature of the old work I hope to deal with is the perfectly simple but very effective arrangement of the chimneys.

This importance of simplicity has, of course, been perfectly recognised by our leading architects, who have made a special study of old Domestic work, but it is still so far from being generally adopted or approved by architects and still more by clients that I may perhaps be excused for calling attention to it. R. N.

THE PROTECTION OF BUILDINGS FROM LIGHTNING:

ARE CONDUCTORS EFFICACIOUS?

the meeting of the British Association at Bath, on Wednesday, the members of the Mathematical and the Mechanical Sections had a meeting in the St. James's Memorial Hall for the special purpose of discussing the question of lightning conductors. The chair was occupied by Professor G. F. Fitzgerald, President of the Mathematical and Physical Science Section.

Mr. W. H. Preece, President of the Mechanical Section, opened the discussion, and said (we quote from the *Times'* report) that if we wanted to know anything about atmospherical electricity, we had to go back to the works of Benjamin Franklin, 100 years ago. Up to 1870 there were absolutely no rules for the guidance of those who desired to erect lightning conductors for the protection of buildings. In that year a great conference was held on the subject, and the result of its deliberations was published in a book, and included a set of rules for the construction of conductors. We had since had great experience of them. He had under his supervision no fewer than 500,000 lightning conductors. Some time ago a lectureship on atmospheric electricity was founded in memory of Dr. Mann, who experimented on the protection of buildings in South Africa. Professor Oliver J. Lodge was selected as the lecturer, but instead of cracking-up the work of the Conference, he took the other line, and if his statements were true, lightning-conductors would be of no use, and no buildings would be safe in a thunderstorm. Professor Lodge had committed himself to fallacies which it was now his duty to bring before the meeting. The Professor assumed that a lightning-rod formed part of the flash. Well, it did not. Nobody had ever seen a flash of lightning strike a conductor. The function of a conductor was to prevent the possibility of the building being struck by the flash. If it should be struck, there was some defect in the construction of the conductor. Lightning did not go careering wildly about, but passed along a path prepared for it. There was another fallacy, viz., that a flash of lightning was instantaneous. There was no proof of that. We saw a flash of light, which indicated part of the discharge, but how long the discharge lasted we did not know. There were invisible flashes of lightning, which was proved by the fact that persons had been killed under trees when there was no visible flash. He, however, came to that conclusion from the effect on telegraph wires, when there were currents of sensible duration, showing that the flash was not instantaneous. The next part was hardest to discuss. It was the assertion that lightning was oscillatory in its character; that it did not go direct from the cloud to the earth, but went flashing backwards and forwards with considerable frequency. This assertion was based more on mathematical reason than on absolute observation, and engineers had no great respect for mathematical development unless it were confirmed by absolute experiment. The facts against the theory were that electro-magnets were affected for a considerable duration of time by lightning flashes. Iron and steel were affected, and he had heard letters of the alphabet signalled along the telegraph wires by a flash,—the letter R, which needed three signs, C, which needed four, and there was a case on record of G, which needed eight signs. Under those circumstances the flash could not be oscillatory unless the oscillations were very infrequent. A discharge from condensers or Leyden jars might be oscillatory, but they were dealing with flashes of lightning. While he was attacking Professor Lodge in that way, he must say that no one had worked harder or more honestly in the matter. Professor Lodge had made experiments, and they were correct, from which he deduced that the self-induction of copper was greater than that of iron. He also had made similar experiments, but with just the opposite result. There was no doubt the Professor was on the brink of a discovery. He had started a fresh hare which electricians must follow up and kill. Self-induction was called up to explain all the phenomena which they did not understand, and he inclined to think it was very much what the Americans called a bug. In the telegraph science they had known it for many years, and called it electro-magnetic inertia. The next fallacy was that most conductors did not protect any area, but it was known from evidence that they did. He preferred to stand upon the experience of the past rather than upon Professor Lodge's mathematical assumptions. There was a tendency to hasty generalisation among mathematicians, but there could be no doubt that the experiments of Professor Lodge and others were opening their minds to the true nature of electricity, and that they would in time be able to speak of the mechanical character of electricity. They wanted to know where the energy came from which was so destructive in a flash of lightning. Aqueous vapour condensed and falling as rain at the rate of one millimètre per acre per hour developed an energy of 600 horse-power per acre. There was the creation of the energy which only wanted further development to turn into a source of electrical energy. He felt convinced that the result of this discussion would be to establish the truth of the position taken up by the Lightning Rod Conference, and would bring to the front what they were all anxious to see, the true theory of electricity shadowed forth by Professor Fitzgerald in his opening address, and that would make this meeting an epoch in the history of electricity.

Professor Oliver J. Lodge said he had no lightning-conductors under his supervision, and all his conclusions were formed from experiments, and if they were correct very few buildings were effectively and thoroughly protected at the present time; and, further, if his views were correct, lightning-rods would in the future cost very much less than now. The term electro-magnetic inertia seemed to imply that they knew more than they did, so he preferred self-induction until they attained to knowledge. Mr. Preece said that no properly-constructed rod ever failed, but in the report to the Conference there were a number of entire failures named. He had made some very careful experiments in which he provided alternative courses for an electric current, and he found that it required less electro motive force to send the current along a thin iron wire than along a

thick copper one. According to Mr. Preece, the object of the conductor was to prevent a flash of lightning, but wires were struck and melted. The conductor had two functions to perform—to act as a point and prevent a flash if it could, and to carry off a flash when it could not help receiving. The electricity above had some energy, and they could not hocus-pocus it out of existence. It might be better to let it dribble away slowly down a bad conductor than to let it rush headlong down a good one. The length of flash was a question for the consideration of meteorologists, and the duration of flashes was a point on which the same gentlemen might do good work. He had seen flashes which appeared to last two or three seconds, but he thought they must have been a succession of flashes. The fact that flashes deflected the compass needle did not prove that they were not oscillatory, nor did it prove anything as to their duration. A short, powerful flash might produce the same effects. There was the question of a flash magnetising a bar of steel. An oscillating current ought not to do that. Professor Ewin used an oscillating current to demagnetise steel. The charging of a Leyden jar illustrated the oscillating current. The charging was like lifting a rod suspended freely at one end to a horizontal position (the rod representing the charge). When the jar was discharged it was like releasing the rod; it must oscillate, and so must the electricity, and its oscillation would vary in accordance with the friction and other modifying causes. The greater the electromagnetic inertia, the greater the oscillation. With regard to the protection of areas, the area which Mr. Preece admitted he protected was so small that they might give it him without discussion. There was, however, in his opinion no sure area of protection. Mr. Preece might have pressed him hard on the question of the conditions of a flash. He (the speaker) had assumed that the flash behaved as electricity did in an experiment. The cloud, however, was not like the tinfoil of a Leyden jar; it was made up of atoms with spaces between them, and a discharge might be more like that of a spangle jar, or might be dribbled away a bit at a time and not by great rushes. But they could not assume that it would always do so, and must prepare for the occurrence of a great rush. The true character of lightning must be discovered by observing lightning, and not by experiments in a laboratory. The spark of one induction coil at a considerable distance would start another one sparking merely by its light. From that he came to the conclusion that when there was a very bright flash of lightning it must involve very important consequences. There was no doubt that it would cause discharges all over the charged area, and so he would say that areas of protection were misleading, and if a flash had that effect they had better be without any conductor at all.

The Hon. Ralph Abercrombie, who showed a number of photographs of lightning flashes, said there was no absolute evidence in photographs of flashes of lightning following each other rapidly on exactly the same path. There was, however, distinct evidence of the tendency of lightning flashes to occur parallel to each other. There seemed to be a tendency in lightning flashes to be ramified, to give off threads all round the main flash. Photography gave conclusive evidence that flashes were not so instantaneous as was generally supposed. It showed that the flash did not jump from a cloud straight to the earth, but went meandering through the air and tying itself into knots, so that it could not be so instantaneous as was imagined. He was of opinion that lightning clouds were generally more than 5,000 ft. high, but there was no evidence of one of more than 7,000 ft. high.

Lord Rayleigh said that, although some mathematicians were unpractical, yet it was to mathematicians one must go to find the results of known causes under new circumstances. He had no special knowledge of lightning-conductors, but from his general acquaintance with electricity he should say that Professor Lodge's experiments would be a most important practical appreciation to lightning-conductors in the future. Mr. Preece spoke of the development of energy by the condensation of vapour into water, but the question was to find how some of that energy came to take the electrical form. Sir W. Thomson said that mathematicians never predicted that the Atlantic cable could not be laid, but a celebrated engineer did so. He thought Professor Lodge was in the American stage of inertia, and Mr. Preece in the English stage. He believed that if Professor Lodge proceeded with his experiments he would confirm his discovery that iron wire was a better conductor than copper. Self-induction was in the air, and they were talking of nothing else. He thought Mr. Abercrombie's idea as to the duration was correct. It seemed to him probable that it was the sound of one spark which caused another rather than the light. There was the photograph giving three parallel flashes. It would be well if some experiments could be made to discover whether flashes occurring like that were simultaneous or followed one another, being started by the light or sound vibrations of the first. It was rather startling to find that a lightning-rod had protecting power over so small an area, and he would like to ask Mr. Preece whether copper had been experimentally proved to be better than iron. They could come to one conclusion from what they had heard, namely, that houses made of sheet iron would be the safest possible places in a thunderstorm.

Professor Rowland observed that the conditions of Professor Lodge's experiments were scarcely the same as those of actual lightning, and he pointed out that the length of the spark was no measure of the resistance of the conductor. Further, he showed some effects in Mr. Abercrombie's photographs which were probably due to the astigmatism in the lens of the camera.

M. De Fonvielle, who spoke in French, said he, with Mr. Preece, was a supporter of the old lightning-conductor theory, and he was partly led to that state of mind by the fact that there were large numbers of conductors in Paris, and there was very seldom an accident caused by lightning. The large number of lightning-rods in a city could not fail to protect the city generally from the effects of lightning, and to help in discharging a thundercloud passing over it.

Professor George Forbes said that Mr. Preece did not mean to say that mathematicians came to wrong conclusions when they had all the right data, but that they sometimes came to a conclusion without taking all the data into consideration. Professor Lodge had come to say that if iron was not better than copper, it was at least as good; but they could not be quite prepared to accept that, because the experiments might be tried in instances more nearly approaching the natural conditions, and in that case they believed copper would be found to be the best.

Sir J. Douglass said that his experience of lighthouses protected by lightning-rods covered a space of forty years, and was comforting to the members of the Lightning Rod Committee. He never knew a rod fulfilling the conditions he prescribed to fail in protecting the lighthouse.

Mr. G. J. Symons said he had investigated every accident by lightning of which he could hear, and had so got valuable experience. The conclusion left on his mind was that if people would erect conductors precisely in accordance with the rules laid down by the Conference, and fulfilling all the conditions, they would be absolutely safe. Where accidents occurred to buildings with conductors, there was a reasonable explanation to be found. Professor Lodge's experiments were laboratory experiments, and to get the real facts they must have something on a much larger scale—perhaps by a series of interrupted conductors on the tops of some of those high hills where storms frequently occurred. With regard to protected areas, there were only two cases on record, and those doubtful, of anything being struck within a protected area.

Dr. Walker said he saw an obelisk on top of a hill struck. The top was knocked off, and the fluid came from the steps of the monument at fourteen different points, ploughing up the ground, and breaking rock at 100 ft. distance.

Professor Lodge said he could not understand why a conductor should have such a good earth. Why did not three points do at the bottom as well as at the top? If properly-constructed conductors never failed, how was it that the hotel at Brussels was burnt, for that was considered protected in the most orthodox way? He would not say that conductors were of no use; they were of great use, but not absolutely certain. In his experiment he was bound to adopt the plan he did, because the experiment could not be done in any other way. It was only the outer surface of the conductor which conducted, and he did not know that there was any good in the centre of a rod. A tube would do as well, and would be all the better if opened out into a flat bar, and yet better than that would be a strand of wires. Iron buildings, to be safe, must have perfect connexions, for the smallest gap might give off a spark. That was the danger in houses supplied with gas; if the fluid travelled along the pipes and came to a gap a spark and explosion might result.

Mr. Preece said the points between Professor Lodge and himself were reduced to a very small compass indeed. He himself had always been a great advocate of iron on account of its cheapness. The use of copper caused needless expense in the erection of lightning conductors. He believed every private house could be protected in accordance with the recommendations of the Conference for 1*l.* if people would buy a coil of stranded iron wire a quarter of an inch in diameter with the final points, and have that put up.

The president summed up the discussion, and said the principal thing for them to pay attention to was that prevention was better than cure. There could be very little doubt that the presence of a considerable number of conductors afforded a great deal of protection to the area in which it existed, as was shown in the instance of Paris. It was desired, if possible, that the whole country should be covered with conductors to prevent the discharge of flashes. There was no doubt that, though there might be room for improvement in the conductors, they had on the whole been right.

THE TRADES' UNION CONGRESS AT BRADFORD.

SOME points of the proceedings at the twenty-first yearly Trades' Union Congress, held last week at Bradford, may here be put on record.

Mr. H. Broadhurst, M.P., read the report of the Parliamentary Committee, which contained the following passage:—

"During the past year the issues from the Board of Trade have been of some importance, but have not, perhaps, been sufficiently circulated to receive the attention they deserve. A large volume of wages statistics, historical in character, and ranging back from 1886 to 1830, is interesting, as illustrating the vicissitudes of wages during that period, and also as showing the industrial revolution through which many trades have passed. A glimpse has also been afforded of the miserable condition of many of our fellow workers in Belgium by the publication through the Board of Trade of a volume of statistical and other information as to the wages and general condition of the Belgian workers, translated from the report of a Belgian Commission of Inquiry. But the work of the department under notice most valuable to us as working men has been the reports of the Labour Correspondent on Foreign Immigration and the sweating system in the East End of London. The general attention that has been called to the evil of the sub-contract system through the facts that have been brought to light with regard to it have more than vindicated the accuracy of the report of our late colleague, and the Congress has reason to congratulate itself upon these further results of the appointment of practical workmen to take part in those departments of the work of the State which apply and belong exclusively to labour. Remonstrances have been received from most influential quarters as to the diversity of the questions dealt with by the Congress and the recent tendency to drift into political and controversial subjects outside the scope of Trades Unions. The complaints are not exceptional and incidental; they are both numerous and important, and cannot therefore be ignored. The Congress is a non-political body, and its deliberations should be confined to strictly trade questions. No progress has been made with the question of a further increase in the staff of Factory and Workshop Inspectors, the Government giving as a reason for declining to consider it that they prefer to await the report of the Committee that has been appointed to inquire into the sweating system. We congratulate the trades on the comparative industrial peace experienced since our last meeting. No great national labour contest has occurred to strain the resources of our Unions, or to disturb the relations between capital and labour. We think that, on the whole, trade has improved, and that no general reductions have been made in wages; but, on the contrary, there has in some industries been a tendency for the rate of wages to increase."

The President (Mr. S. Shaftoe) in his inaugural address, said that

"Whatever Trades Unions had won, they had secured by their force of justice, by their numbers, by their political power, and by their influence on public opinion, their demands being focussed by the Congresses. Whatever generous sentiment might animate any action of the possessors of capital, they could not alter the character of capitalism. Economic forces were working against humanitarianism; capitalism, in its struggle to acquire more, would work labour fifteen or eighteen hours

per day, and expect it to live on almost anything. It was against this tendency that Trades Unions fought, and their Congresses had obtained many valuable victories. Thus they could point with pride to the Factory Acts of 1874, 1878, and 1883; the Employers' Liability Act, the Truck Act, and the Mines Regulation Act. These were but a few of the measures promoted by the Congresses; they were, however, sufficient to act as landmarks in the elevation of the people. But hard though the struggles of past Congresses had been, those of the future would be equally keen, for they could not remain satisfied with the projected Employers' Liability Act or the recent Mines Regulation Act; they could not remain silent, as millions were spent on useless wars, while a grudging Home Office starved the factory inspectorate and allowed workshops to be unvisited for years. It would require from our legislators something more than Royal Commissions to inquire into overcrowding and sweating; it would demand that the logical conclusions of these bodies should be applied. Being on the threshold of great changes, they could not stand still if they would; they had on the one side the competition of new mechanical inventions, and on the other a continuously increasing population. Both these rendered the problem of life more difficult. After pointing out that the general effect of the introduction of machinery during the past forty years had been to effect a saving of labour to the extent of 40 per cent. in the production of any given article, he said this pointed to the necessity of a reduction in the hours of labour, and there had been a rapid growth of opinion in favour of an eight hours day. Strong reasons existed for applying such a system to miners and railway servants, who had claims for consideration not usually found in other trades."

The Inspection of Factories and Workshops.

Mr. Birtwistle (Accrington) moved the following resolution:—

This Congress views with considerable alarm the violations of the Factory and Workshops Acts that are daily taking place in various parts of the country, and instructs the Parliamentary Committee to make a special effort to induce Parliament to appoint a considerable additional number of practical persons as Factory and Workshops Inspectors.

He argued that under present conditions it was impossible for the inspectors to attend properly to their duties. What was mostly needed was a considerable augmentation of the number of inspectors already appointed. They did not wish to see men of their own class appointed exclusively to these positions; but they did insist on having practical men, who knew their business, whether managers or anything else. They should like a fair proportion of them to be drawn from the working men.

Mr. C. Freak, London, seconded the motion, which was adopted.

The Employers' Liability Bill.

Mr. J. S. Murchie, Manchester, moved the following resolution:—

That this Congress desires to express its strong dissatisfaction with the Employers' Liability for Injuries to Workmen Bill in the form in which it is agreed to and reported by the Standing Committee on Law, and trusts that Parliament will so amend it as to abolish the doctrine of common employment, render notice of injury unnecessary, to abolish the clause fixing the maximum amount recoverable, and render contracting out of the Act in any form strictly illegal.

Mr. S. Woods, Wigan, seconded the resolution, and contended that no Bill should be accepted which allowed employers to contract away their responsibility.

Mr. Broadhurst, M.P., suggested that after the question has been discussed, a memorial should be drawn up and signed by the delegates present, and that a committee should also be instructed to make arrangements for a deputation to wait on the Government, representative of all parts of the country and all trades. They would need all the influence they could get from every quarter, and they would have to put the utmost possible strain on their representatives in Parliament in order to make the Bill worthy of acceptance. It was their duty to demand their rights, and to never rest satisfied until they were granted in their most complete and absolute form. The present Act was far preferable to the proposed one.

Mr. John Wilson (Durham) supported the resolution.

A desultory discussion ensued, in the course of which Mr. Murchie suggested the following addition to the resolution:—"And that the proposed limited extension of the Act to seamen is entirely inadequate, and does not meet the fair and just claims of the workmen employed at sea."

Several delegates supported the suggestion.

Mr. Thomas Burt, M.P., on the suggestion of Mr. Threlfall, was invited to address the Congress on the subject. He said that the labour representatives had never been favourable to workmen contracting themselves out of the Act; and it was important to remember that before that could be done the workman must have made a request in writing. As to insurance, they had never opposed employers protecting themselves in that way; but it was another thing altogether to expect workmen to be parties to giving up claims that Parliament had already declared them to be entitled to.

The resolution, with the addition suggested, was then agreed to.

On the proposal of Mr. Pickard, M.P., seconded by Mr. Jenkins (Cardiff), a memorial to the Government was adopted, calling attention to the inadequate nature of the Employers' Liability Bill, and urging the desirability of so amending the Bill on the report stage as to bring it within the reasonable requirements of those whom it seeks to benefit. The memorial points out that Clause 1, as it now stands, leaves the law of common employment in full force, to the great injury of and injustice to the working classes; that Clause 3, enabling employers, upon certain conditions, to contract themselves out of the Act, is open to objections, not only from the workman's point of view but on grounds of public policy, that are numerous and insuperable. As to Clause 9, the memorialists acknowledged the liberality of the Grand Committee in increasing the lump-sum amount recoverable in Clause 9 from £150 to £250, but they contended that the proposal to make it £500 is only reasonable; even then it is but a compromise with the justice of the case. Clause 12 (imposing upon the common-law rights of the workman to sue his employer for negligence the conditions as to notice, limitation of time, &c., by which the Act regulates the statutory right of action which it confers) was described as a most objectionable proposal. Clause 13 was recognised as an admission that seamen have rights to compensation, but the memorialists do not admit that the clause, to any appreciable degree, satisfies those rights, as the Bill makes it a condition that the "defect" must have existed at the time when the ship last proceeded to sea from a port in the United Kingdom. It would appear from this wording that the moment a ship has entered a foreign port the protection to seamen ceases. The memorialists ask the Government to omit the words named, as an injury received coming home is equally entitled to satisfaction as an injury received going out.

The Eight Hours' Question.

Mr. J. Maudsley (Manchester) submitted the report of the Parliamentary Committee on the *plébiscite* as to an eight hours' day. It stated that in summarising the whole of the returns it was impossible to give a definite opinion as to which way the balance lay, as the number of the votes returned was so small, and it was consequently open for any one to put the opinion of those members who had not voted on which side they chose. A perusal of the returns would, however, be sufficient to satisfy any unprejudiced person that the time had not yet arrived for commencing an agitation for the eight hours' day.

A short discussion ensued, and it was suggested that the report should be printed, so that the delegates might have the figures before them previous to voting on the motion for the adoption of the report. This course was agreed to.

Subsequently, Mr. J. Keir Hardie (Ayrshire) moved that the question of the eight hours' day be referred to the Parliamentary Committee, with instructions to take a vote of the trades on the following issues: First, "Are you in favour of an eight hours' day?" Second, "Are you in favour of its being obtained by Act of Parliament?" Only those who answered the first question in the affirmative to be allowed to vote on the second question.

Mr. Stevens (Birmingham) seconded the resolution, which was adopted.

Deductions from Wages.

Mr. Drummond (London) moved:—

"That it shall not be lawful for any employer, or his agent, to make it a condition of the hiring that a workman's wages shall be liable to deductions from any fund, or to any benefit, charitable, or provident institution, from which a workman is not entiled to derive any benefit after he has ceased to remain in that employment. No deduction shall be made from a workman's wages for any work, materials, machinery, or tools which may have been spoiled or injured by him in the course of his employment, nor shall it be lawful for an employer to make it a condition of the hiring of a workman that he is willing to hold himself responsible for any such spoilage or injury; provided always that such spoilage or injury has not been brought about by any act wilfully committed by the said workman himself, or in concert with any other person or persons. No deductions shall be made from a workman's wages for any time he may lose when employed upon piecework, nor shall a workman employed upon time be liable to have deducted from his wages more than the actual value of the time lost at the ordinary rate of wages of the said workman. No deductions shall be made from a workman's wages for any fines imposed by an employer or his agent for any purpose whatsoever; nor shall it be lawful for any employer to make it a condition of the hiring that such fines may be imposed."

Mr. Bloor (Burslem) seconded the motion.

Mr. Wilson (Sunderland) asked that the resolution should include seamen, and this was agreed to.

Mr. George Silk (Oldham) moved, as an amendment, that the resolution end with the first sentence. The rest, he said, was merely a trade question, and he made his suggestion on one of the first principles of trades unionism, that they helped those who helped themselves.

Mr. Mellor (Oldham) seconded the amendment.

Mrs. Cooper (London) suggested that women should be included among the workers, and this was agreed to.

Mr. Silk's amendment received little support, and the resolution was carried.

On the suggestion of Mr. Abrahams, the mover of the resolution agreed to strike out from the first sentence the words "from which," to the end of the sentence.

Joint Boards of Employers and Workmen.

Mr. Wardley (Sheffield) moved—

"That this Congress is of opinion that the formation of joint boards, composed equally of employers and workmen, is very necessary, and would bring about a better understanding between them, and secure settlement of vexed questions affecting the interest of both, and urges the workmen of the large centres of industry to bring the matter before the Chambers of Commerce and other bodies of employers, in order to facilitate the formation of such boards."

Mr. Holmes (Leicester) seconded the resolution, and remarked that the appointment of such boards would tend to prevent strikes.

The resolution was agreed to unanimously.

Registration of Trades Unions.

On the motion of Mr. A. Wilkie, seconded by Mr. J. Heslop, it was resolved—

"That it be an instruction to the Parliamentary Committee to secure an alteration of the Registrar's regulations, or, if necessary, an alteration of the Acts, so that the registration of a Trades Union registered in Scotland under the Trades Union Acts, 1871 and 1876, shall apply to and be valid either in England or Ireland, should in any case its general office be removed to either country, or *vice versâ* as the case may arise, and terminate the present inconvenient and expensive system, that when a general office of a Trades Union is removed from one kingdom to another the registration of the rules must be cancelled in the one and re-registered as a new association in the other."

Picketing by Men on Strike.

Mr. Kell (Leicester) raised a question as to whether picketing by men on strike is legal under the "Conspiracy and Protection of Property Act, 1875," remarking that according to the ruling of the Judges peaceful picketing is illegal. He moved:—

"That this Congress is of opinion that the definitions as given, and the interpretations of the above Act by Justices Stephen and Hawkins are contrary to the intentions of the framers of the Act, when placing the same as a statute, and as defined by Mr. Secretary Cross in a circular to the magistracy. Further, this Congress instructs the Parliamentary Committee to take such action as may be deemed necessary to ascertain the true meaning of the Act."

Mr. G. Rogerson (Leeds) seconded the resolution, which was carried.

It was resolved to hold next year's Congress in Dundee.

ARCHES, NAVE TRIFORIUM, BEVERLEY MINSTER.

SIR,—Last year I carefully measured the arches at the back of the nave triforium to which Mr. Littlehales refers in his letter in your last issue [p. 183], and I quite agree with him that there is no ground whatever for the supposition that the voussoirs ornamented with the zigzag are in their original position. To say nothing of the structural impracticability of retaining these arches while the later work was being constructed below, around, and above them, there is every indication that the arch-stones are simply old materials from the Norman church worked up again in the fourteenth-century work.

Their situation, however, is interesting, as throwing some light on the history of the building. The back of the triforium throughout the church shows in each bay a single semi-circular arch between the square buttresses, the form of the arch being here no indication of early work, but simply the most convenient form for the purpose. The arches which have the zigzag ornament are the second and third westward of the crossing on both the north and south sides of the nave—*i.e.*, the first two bays of the nave, which was added in the fourteenth century to the Early English choir and transepts; indeed, on the north side the rough toothings which

finish the thirteenth-century work can still be seen. The fourth bay from the crossing on the north side has a single stone with the zigzag ornament worked upon it at the eastern springing of the arch. Both this bay and the two or three bays immediately to the west have a Norman roll-string course walled in just above the vaulting of the aisles. This string does not occur on the south side, where the Norman work is confined to the arch-stones of the second and third bays from the crossing. The zigzag is formed by sinking a moulding in the face of the stone on each side of the angle, the angle itself being square, not serrated, as is more usually the case.

The choir and transepts were commenced after the fire of 1188, and completed in the first half of the thirteenth century, and nearly a hundred years seem to have elapsed before the nave was commenced. It appears probable that the Norman nave was left standing until the works were resumed in the fourteenth century, and it would then be very natural to re-use old materials in such a position as the back of the triforium. The span of the arches in question (9½ to 12 ft.) shows that the arch-stones must have formed part of the main arcade of either the ground story or the triforium of the Norman church. Two arch-stones, ornamented in exactly the same manner, were found in cutting a hole through the wall of the south choir aisle (Early English work), which would indicate that the church which immediately preceded the present structure was of one date throughout. Possibly it resembled the earlier bays of the nave of Selby, the arches of which are of about the same span.

Hull, Sept. 10. JOHN BILSON.

ANCIENT INSCRIPTION AT KENDAL.

SIR,—The reading of the inscription referred to by your correspondent [p. 183, *ante*] should be as follows:—

"Esto porta patens, nulli claudaris honesto."

It is a motto of frequent occurrence on ancient doorways. It is interesting from the fact that it depends upon where the comma be placed to have a wholesome or sinister meaning, for if the point follow *patens*, it signifies "This door must be open, to no honest man let it be shut"; but if the point follow *nulli*, it reads, "This door must be open to no one, to the honest man let it be shut."

It may be of interest, likewise, to your readers to add that the origin of the French proverb, "Pour un point Martin perdit son âne," arose, 'tis said, with regard to an error in the punctuation of the motto, for an Abbot of Asello, named Martin, had it placed over the abbey gateway, with the stop apparently very boldly cut after "nulli." Legend adds that the Pope, seeing or hearing of it, suspended the Abbot, deeming such an error to indicate either a spirit contrary to monasticism or an illiterateness nearly as blameful.

So, if a person lose a good thing for a trifling cause, he is said to have acted like Martin, who lost his ass for a trifle.

A. E. P. RAYMUND DOWLING.

Sledmere, York.

The Student's Column.

ARTIFICIAL STONES.—XI.

Concretes (continued).

IN Wheble's specification (1860, patent 3,003), the importance of using lime while still hot is insisted on; this is to be mixed with about 3 parts of sand, gravel, shingle, or ordinary dry rubbish, and then sufficient water added, and the mixture placed in moulds or frames to set.

Very frequently we meet with a recognition by patentees of the fact, too often overlooked by rule-of-thumb operators, that the amount of water used must be kept down to the lowest possible limit if concrete or stone of maximum density and strength is desired. It may be considered, then, a generally applicable rule, that only just sufficient water should be added as will enable the cement to hold the aggregate together.

In some patents the point of novelty is the addition to the water used of certain acids or salts capable of reacting on the cements or other ingredients used in the formation of the concrete. J. Begué, in 1864, considered, for example, that a mixture of 2 parts of urine and 1 part of salt mingled with 20 parts of "common earth," fine sand, potters' clay, peat and coal, constituted a valuable stone-forming mixture. A more ornamental stone, according to the same inventor, was made up of 33 parts of pulverised bottle glass, 66 parts of clay, 1 part of porcelain clay, and the whole diluted with urine or a mixture of salt and urine. This patent is an example of the putting together of a number of ingredients with the only object, apparently, of introducing sufficient novelty to secure protection. The addition of salt to the mixture could only result in the formation of a damp-attracting stone, and urine has only nastiness as its quality in such a connexion. If the small proportion of phosphates and other salts in such a fluid is of any real assistance, they might be added in a far less objectionable manner than the one proposed.

W. Kirrage in 1865 added to the mixture of sand, gravel, cement, &c., a solution of sulphate of iron in water. In this case the sulphate of lime formed assists in increasing the binding power of the cement, and the hydrate of iron simultaneously produced is also valuable in this direction, but imparts to the stone a brown colour.

Setchell preferred to add water and hydrochloric acid to a mixture of gravel, broken stone, or brick ballast, to which had been added Portland cement, iron filings, or slag. The iron filings are acted on by the acid, the chloride being formed, and this, decomposed by the lime salts present in the mixture, produces basic carbonate and hydrate of iron, increasing the density of the resulting stone. Unfortunately there will be formed at the same time the very deliquescent chloride of calcium, which neutralises to some extent the advantage gained. It would be well if patentees would avoid, whenever possible, the addition of chlorides to stone-forming mixtures; such additions almost invariably prove ultimately to be a source of weakness, and detract seriously from the reputation of an otherwise good stone. It may be, as some contend, that the proportion of chloride of sodium or salt in sea sand is so small that it constitutes no sufficient excuse for the rejection of this material in mortar-making; yet it is this small proportion that has caused it to be rejected in favour of river or other sand by the conscientious builder.

In Robertson's patent (1874, pat. 2,047) this undesirable formation of a class of soluble compounds in the body of the stone is again effected. The matrix, as the inventor calls it, is made up of gravel, shingle, stones, glass, burnt clay, and like materials, either separately or mixed, and is triturated with water, making in solution either a chloride, bromide, iodide, or fluoride in saturated solution, chloride of calcium being preferred. The material so treated is subjected to high pressure, redipped in solution, and allowed to set on wet sand-beds. Drevet's "Béton Français" is composed of sand or river mud, hydraulic cement, and marine salt, this last being the point of novelty, and a most objectionable one.

A patent which deservedly received "provisional protection only," in 1875, was a remarkable instance of the astounding groping about in the dark which characterises the labours of some would-be patentees; in this case, with the object, as the specification describes it, of neutralising the quick-lime, which causes artificial stone made with it to crack after a time, "azotic"* acid is added to the water used for making up the stone. This is truly a case of "save me from the doctor," for a destruction of strength directly proportional to the amount of acid added, and the formation of soluble nitrate of lime, which would form an unsightly efflorescence on the surface of stone so treated, would inevitably result.

* A very antiquated term, applied to nitric acid.

The Strike of Joiners and Carpenters in Leeds has terminated. On the 7th inst. an interview took place between the deputations respectively appointed by the Leeds Master Builders' Association, and the workmen who have been on strike, to further consider terms upon which the dispute might be terminated. Mr. Craven presided, and was supported by Messrs. Irwin, Tomlinson, Nicholson, Mawson, and Thorp. The deputation from the operatives' associations consisted of Messrs. Pallister, Thompson, Stell, Goodson, Wilson, Sewell, Lofthouse, and Knowles.—The masters now submitted for consideration an amended code of rules, the first and most important regulation being altered so as to read as follows:—"That carpenters' and joiners' wages be at the rate of 7½d. per hour for skilled workmen." These terms were accepted by the men on the condition that they were in future paid time and a-quarter for the first two hours' overtime, and time and a-half for every subsequent hour. Also that walking time be allowed as arranged before the strike.

Books.

Histoire de la Céramique Grecque. Par OLIVIER RAYET, Professeur d'Archéologie près la Bibliothèque Nationale; et Maxime Collignon, Chargé du cours d'Archéologie à la Faculté des Lettres de Paris. (Paris: Georges Decaux, 7, Rue du Croissant. 1888.)

THE book before us supplies a want long felt. The study of Greek Ceramography has of late years advanced with vast strides; not only have new stores of material been added, but the whole method of the subject has undergone a complete revolution. Greek vases when first discovered were regarded as things of elegant shape and curious decoration, matter for the artist and antiquary; next, very slowly it dawned upon the archæological world that they are a storehouse of information as to mythology and ancient life; last, and quite of late, they have come to be studied for themselves, as a branch of Greek art, well deserving of the attention of the specialist. It was no uncommon thing to find a first-rate archæologist of the past generation treating vase-paintings as merely an elegant form of illustration of the legends left us by Greek poets, an attitude which the mere atmosphere of modern archæological thought renders wholly impossible.

As soon as a subject has taken real hold of the professional mind, as one of independent value and wide-reaching interest, the next step is sure to be nowadays an attempt to present that subject, its method, and its interest, in readable form to the general educated public. And, further, it may almost safely be predicted that attempt will be made by a Frenchman. In England we have, indeed, Birch's "Ancient Pottery," published in 1857, a book admirable in its day, but now practically obsolete. Since that date, if we in England have learnt anything new about Greek vases we have not dared to tell it, save in the ear of the specialist. Germany, always ahead in investigation, suffers from a national incapacity to popularise. A handbook of Greek Ceramography, by Dr. Furtwängler, has long been looked for, but is not forthcoming yet. As he has lately been seen in the British Museum examining the Naucratis fragments, we may hope it was with intention. At present Messieurs Rayet and Collignon hold the field undisputed. The book was originally projected by M. Rayet alone. He had many qualifications for the task; he was well known as an amateur collector, and his lucid, easy style had been proved in his popular "Monuments de l'Art dans l'Antiquité." His work was, however, cut short by the disastrous illness that ended in his death last February year. M. Collignon, at the desire of M. Rayet's family, completes the book. We may say at once that the chapters by M. Collignon are pure gain; they bring the book up to date,—a matter in which M. Rayet's portion is necessarily somewhat deficient. To M. Collignon is due the excellent "Introduction" on the technique of vases and the places of their fabrication, and their subsequent commercial distribution. Nothing could be more admirable than this chapter; and no chapter was more necessary. It is in the close study of technique and of material, and the tracing out of trade routes and the like, that the greatest advance has been of late made in the subject. This introduction,—as, indeed, the whole book,—is most amply and judiciously illustrated. We have, from vase paintings themselves, two scenes in the studios of potters by which every stage of the process is illustrated; a potter stoking his furnace, a view of the vases baking within, another of a merchant-ship with a cargo of pottery; the method of packing,—which seems somewhat unduly slight; and last, and perhaps most instructive of all, a fragment from the Sèvres Museum in which the painting of the ground of a red-figured vase is only half filled in.

Speaking generally, the book does not disappoint its promise. It is very full and very clear, with that subordination of detail, that compactness of form, which seem to come by nature to the French. Any one who reads the book through will get a good general notion of Greek pottery of all periods, from the rudest shapes of Troy belonging to—well, it is safer not to say what century—down to the latest efforts of the Græco-Italian school; he will, moreover, learn incidentally a great deal of the subject-matter of vases, and nearly all that is known about the manner of particular vase painters. He will have clearly brought before him the geographical distribution of vases, and

the characteristics of the most important centres of fabrication; and he will conclude with a valuable chapter on the "Ceramics of Architecture." He will have for reference 16 beautiful coloured plates, and 145 for the most part excellent woodcuts, all chosen with great judgment. While on the subject of illustrations, we must enter one protest. Why is a vase which is—we say it without hesitation—the most beautiful in the world—the Aphrodite cup from Cameiros in the British Museum—fated to be constantly reproduced in a manner which is simply a parody? We were not surprised to see this odious plate appear some six months ago in Baumeister's "Denkmäler"—the scope and price of the book precludes any striving after perfection—but that it should appear in a French publication (pl. 10) which is almost *de luxe* is too much. To atone — if atonement were possible—we have some additions which will be welcomed even by professional archæologists, notably two new vases by Nicosthenes and Kachrylion.

Looking at the book from the specialist's point of view, which is unavoidable, there is much that might be altered with advantage. The popular purpose of the book compels a certain dogmatism. Everything cannot be discussed in a book of this sort; but how does M. Rayet know for certain that the vases of Corinthian style, inscribed in Corinthian letters and found at Tarquinii and Caere, are "d'une fabrication Corinthiénne transplantée en Italie?" This statement is a mere assumption, though certainly an interesting one. There is much against it, notably the influence that these very vases, supposed to have been made in Italy, had on Attic vases. This class of vases should certainly not have been dealt with apart from the Corinthian plaques, which are sundered from them by nearly one hundred pages. Then, again, what have the all-important classical vases known as Chalcidian done that they should be simply omitted altogether? Whatever theory we incline to as to their "provenance," they are not a class that we can afford to neglect. Speaking of the fragments of red-figured pottery found on the Acropolis by Ross, M. Rayet says:—"Il était bien séduisant de chercher dans ces traivailles une indication chronologique"; but, alas, he, and many others, resisted the seduction, and so Mother Earth has since then yielded up evidence, not only seductive, but compulsory, and we have had to re-date most of our red-figured vases. It was, perhaps, too late to alter the text, but surely a footnote was possible in a matter so all-important. The unwary reader might go to the end and never notice the flyleaf of "additions et corrections." If some of these blemishes would escape the eye of any but the specialist, there is one serious defect even from the popular point of view. There is no chapter on the shapes and uses of vases. Such a chapter is an elementary necessity. It is true that there is much excellent information about the development and modification of shapes at different periods, but it is *scattered*, and, therefore, liable to be overlooked, or, at least, only remembered with difficulty. A want of this initial knowledge of shapes and uses, knowledge that if systematically presented can be acquired once for all in an hour, will seriously hamper the reader if he be a beginner.

All fault found, however, the book is not only a good one, but by far the best we have, and until we get a handbook of our own it should command a large English public. The time is fast coming when mythology will largely be based on, and taught from, vase-paintings, and then every classical student will perforce wish to know something of the sources from which this mythology is derived.

Historical Records of St. Albans, containing the History of the Grammar School and Leprosy in St. Albans during the Middle Ages. By ARTHUR E. GIBBS. (Gibbs & Bamforth.)

ST. ALBANS is an inexhaustible quarry for the archæologist, and its Abbey is only one out of numerous objects around which historical associations of more or less interest cling. The Grammar School dates back a long way. It did not owe its birth to the revival of learning in the fifteenth century or to the Reformation, but has had an almost unbroken existence from the latter part of the twelfth century, and was probably founded at a still earlier period. It was dependent upon the Abbey, and to this circumstance we owe the preservation of many curious details of mediæval school life and government reproduced by Mr. Gibbs. But St. Alban's Grammar School underwent a thorough process of re-modelling in the reign of Edward VI. and Elizabeth. Sir Nicholas Bacon, whose fame has been almost entirely eclipsed by that of his son, took the school under his fostering care and procured for it an endowment. One source of revenue was to be from monies paid for selling wines within the borough, a privilege limited to two or, at most, to three publicans. The custom still prevails, and in 1883 the licences fetched at public auction the sum of £86. The Grammar School was held for a long time in the Lady Chapel of the Abbey Church, which, as may be supposed, suffered no little damage at the hands of the boys,—the beautiful fourteenth century work of Abbot Eversden having been terribly mutilated. Transferred to the Gate House,—the only part of the monastic buildings not destroyed at the Dissolution,—the scholars have less scope for mischief, and, it may be hoped, less inclination. The school has produced some men of mark,—notably Chief Justice Pemberton and the late Professor Donaldson,—and has had in its time some eminent masters. In the first place must stand the anonymous printer,—contemporary with Caxton,—who is called "sometyme scole mayster of Saynt Albon"; then we have Alexander Nequam, a scholastic divine and poet; and lastly James Shirley, the dramatist, who died of grief at the great Fire of London. Space will not allow us to notice what Mr. Gibbs has to say about St. Julyan's Hospital, but we must find room for a word of thanks to him for the good service he has done in making public these interesting results of wide and careful research.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

13,588, Extinguishing Fires in Mills, Theatres, &c. L. A. Walker.

According to this invention, a large number of perforated pipes are led from the main pipe, and are so placed that a spray of water can be directed over the walls, ceilings, and floors. The flow is controlled by separate valves placed easily within reach.

13,680, Roofs. J. Season.

In roofs constructed entirely of iron and slate, the object of this improvement is to afford a more secure and better fastening. It consists in a simple mode of attaching the two sets of angle-irons together. The inner leaf of each horizontal angle is cut or notched for a depth equal to the depth of the crossing-leaf of the other angle-iron. The outside leaves of the horizontal or purlin angle-irons thus rest directly on the outside leaves of the inclined or rafter angle-irons. The two sets are secured where they cross by a bolt and nut, the bolt passing through the outer leaves of each. The slates are attached to the purlin-irons by copper nails or pegs, which pass first over the inner or top leaves, and are then bent down and back under the same.

13,858, Production of Designs or Letters in Artificial Marble or such like Substances. J. B. Rottenstein and H. A. Cousins.

According to this patent, mosaics or designs are formed by placing in a glass or other suitable mould sufficient plastic material, such as cement, as will cover the letter or design it is desired to produce. While still soft a template of the design is placed thereon, and a knife or cutter passed around the template. When the material has partially set, the superfluous pieces are removed, leaving the letters or designs alone in the glass or mould. If they are to be shaded, the material is filled in around them, and afterwards cut in the same way, after which the ground is filled in and the slab finished.

4,518, Opening and Closing Fanlights. J. H. Marston.

The fanlight which is the subject of this patent is actuated by a worm-fixed and cogged-teeth gearing, which is moved by a cord pulley. The opening and closing is controlled by a ladder-bar which guides the casement.

9,733, Double Fan for Wash-out Closets. E. Emmanuel.

By this invention fans are so filled as to spray the water in delivery. By the simultaneous action of the combined fans the basin is thoroughly cleansed. Two fans—an upper and lower one—are used, and by the rapid discharge of the donble fan the contents of the trap are forced out each time the closet is used.

9,856, Window Sashes and Sash Frames. B. Münster.

The sashes which are the subject of this patent are hinged on vertical rods or axles, with bearings in guide blocks sliding in grooves in the top and bottom sash frame; the rods have mounted on them, near the top and bottom, pinions which engage with racks secured to the sash frames along the said grooves.

NEW APPLICATIONS FOR PATENTS.

Aug. 31, 12,540, J. Mason, Skylights, Ventilators, &c.—12,541, J. Cook, Water Closet Apparatus.—12,571, T. Harris, Stoves.—12,582, R. Allen, Door Lock.

Sept. 1, 12,589, H. White, Window Fasteners, &c.—12,592, C. Hamilton, Attaching Incandescent Electric Lights to Gas Brackets or other Fittings.—12,610, W. Evans, Stiles or Gates.

Sept. 3, 12,659, H. Atkinson, Suspending Window Sashes, Doors, &c.—12,660, T. Secker, Door-Steadier.—12,668, J. Taylor, Stench Trap.—12,685, A Spaull and C. Callan, Burglar-proof Sash Fastening.—12,701, O. Imray, Preventing Window Sashes from Shaking.—12,708, E. Nunan, Metal Laths.—12,709, H. Lake, Door Hinges.

Sept. 4, 12,713, T. Sharples and H. Graham, Windows.—12,715, O. Wright, Charging Syphons for Flushing Water Closets.—12,722, J. Finnie, Automatic Door Bottom Guard. — 12,729, G. Böklen, Metallic Roofing.—12,739, J. Hancock, Creating Up-draught in Chimneys, and Ventilating.—12,741, J. Tonge, Chimney-pot.—12,747, W. Phillips, Portable Wooden Houses, &c.—12,758, H. Lake, Circular and other Saws.—12,771, R. Robinson, Die for Brickmaking Machines.

Sept. 5.—12,830, J. McChesney and A. Cobham, Sash-balance.—12,841, A. Jack, Manufacture of Cement.—12,845, F. Allchin, Asphalte Floors, &c.

Sept. 6.—12,878, J. Howie, Flushing Cisterns.—12,896, J. Gerhold, False Back for Fire-grates.—12,910, E. Thomson, Laying Wood Floors, &c.

PROVISIONAL SPECIFICATIONS ACCEPTED.

14,955, D. and W. Bostel, Syphon Flushing Cisterns.—9,358, J. Lind, Stoves.—10,876, W. Hardcastle, Attaching Lines, Cords, or Chains to Window Sashes, &c.—10,940, J. Willing, Sign Letters for Facias, &c.—10,960, E. Newton, Surveying and Levelling Instruments.—10,990. C. Shewbrook's Roofing Tiles.—11,199, J. Ferguson, Finger-plates.—11,264, J. Hollenthoner and A. Wiesenbacher, Flooring for Bakers' Ovens.—11,532, P. Mooney, Syphon Apparatus for W.C.'s.—11,603, C. Darrah, Ventilators.—11,813, A. Lupton, Centrifugal Fans for Ventilating.

COMPLETE SPECIFICATIONS ACCEPTED.

Open to Opposition for Two Months.

14,851, J. Coulter, Stone-dressing Machinery.—14,955, D. and W. Bostel, Syphon-flushing Cisterns.—15,065, F. Ransome, Manufacture of Cement.—15,071, J. Wright, Chimney Top and Ventilator.—15,203, J. West, Water-waste Flushing Cisterns.—15,763, A. Haslam and J. Settle, Fire-places or Grates.—16,459, D. Knowles, Sash-fasteners.—11,275, R. G. and E. Restall, Stoves.

RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

SEPT. 5.

By FAREBROTHER, ELLIS, CLARK, & CO.

City of London—57, Wood-street; and 2, London Wall, freehold	£100,000

By CHADWICK & SONS.

Westminster—53, Tufton-street, freehold	820
8, St. Ann's-lane, freehold	225
Pimlico—7, Charlwood-place, 39 years, ground-rent £8	610
Westminster—10 to 16 even, Coburg-row, 12 years, ground-rent £4	660
Battersea—127, Church-road, 62 years, gronnd-rent £3. 12s.	170
32, Ethelburga-street, 39 years, ground-rent £5. 7s.	205

By WYER, FARMER, & ADAMS.

Kingsland—4, Nancy-street, 44 years, ground-rent £6	160
Mile End—29 to 35 odd, Longnor-road, 76 years, ground-rent £14	720

SEPT. 6.

By T. B. WESTACOTT.

Hoxton—62, Murray-street, 54 years, ground-rent £5. 5s.	420

By NEWBON & HARDING.

Barnsbury — 59, Hemingford-road, 54 years, ground-rent £6	405
29 and 31, Blundell-street, 63 years, ground-rent £10.	485
35 and 37, Blundell-street, 63 years, ground-rent £10.	480
Canonbury — 27, Canonbury-square, 30 years, ground-rent £7. 4s.	400
Ball's-pond—59, Stanley-road, 63 years, ground-rent £4. 2s.	305
Clerkenwell — 34, Margaret-street, 27 years, ground-rent £8	300
Burton-crescent—46, Sandwich-street, 18 years, ground-rent £17. 17s.	350
Tavistock-square — 2, Tavistock-mews, 9 years, ground rent £7. 7s.	70
Brunswick-square—16, 48, 54, and 56, Colonnade, 4 years, ground-rent £6. 6s.	120
18 and 10, Colonnade, 18 years, ground-rent £26. 6s.	60

MEETINGS.

TUESDAY, SEPTEMBER 18.

Glasgow Architectural Association.—Mr. T. Gildard (Hon. President), on "Recollections and Reflections."

WEDNESDAY, SEPTEMBER 19.

Builders' Foremen and Clerks of Works' Institution.—8·30 p.m.

Miscellanea.

A New Seaside Resort on the Kent Coast. A few days since an extensive sale of building land took place on the Littlestone-on-Sea Estate, a new watering-place near the ancient Cinque Port of New Romney, in Kent. The estate, which is upwards of 200 acres in extent, is now being laid out for building. The estate is situated on the margin of an extensive bay, Dover and Folkestone being on the left, and Dungeness Point on the right. Amongst the several new roads which have been formed on the estate, one now in course of construction is 100 ft. wide, and upwards of a mile in length, from which by-roads lead to all parts of the estate. Gas is supplied by the New Romney Gas Company, and water has been laid on. An area of twenty acres is to form a new park, in which a pavilion is to be erected for the accommodation of visitors. The centre of the bay has been selected for the erection of a pier, and opposite to it a large hotel, to be called "The Grand," is in progress of construction. A complete scheme for the sewerage and drainage of the whole estate has been prepared by Mr. Eacchus, C.E., and the work has been commenced. Several houses have already been erected on what is designated the Marine Parade, and others, together with a number of shops, are now in progress. The sale last week was held at the Station Hotel, New Romney, Mr. Charles, of the firm of Messrs. Charles & Tubbs, of Basinghall-street, being the auctioneer. The number of freehold plots offered was 170. The plots had frontages varying from 15 ft. to 30 ft. The sale was very well attended, the company consisting principally of London builders and speculators, who were conveyed to the estate from the Cannon-street station of the South-Eastern Company by a special train. Before offering the property, the auctioneer, amongst other remarks, incidentally observed that the works at the pier, the plans for which had been prepared by Mr. Driver, engineer, would be commenced early next year. There was a keen competition for the several plots, especially for those possessing a sea-frontage. Nearly the whole of the lots offered were sold, the prices realised ranging from 110*l.* to 145*l.* each. The proceeds of the sale amounted to about 7,500*l.*

Sale of Building Sites near Southend.—About a mile-and-a-half to the westward of Southend a large area of land, upwards of twenty acres in extent, and known as the Sea View Estate, is at present being laid out for building purposes, several new roads intersecting the estate being now in course of formation, and on Monday last an extensive sale of the building sites on the estate took place in a marquee erected on the property. The estate is situated between Cliff Town, Southend, and Leigh, standing on the brow of a hill elevated about 120 feet above the level of the sea, sloping gradually to the south, overlooking Southend, and commanding extensive views of the sea, and also of the opposite Kent coast. It is approached from the Leigh Station on the west side along a steep hill. A special train conveyed a numerous party from Fenchurch-street to attend the sale, which was conducted by Mr. W. H. Iles, of East India-road. The plots submitted were 185 in number, having frontages varying from 17 ft. to 20 ft., and depths of from 90 ft. to 160 ft. The auctioneer, in introducing the property, pointed out that Southend was rapidly extending westward, and there could be no doubt that the time was not far distant when Southend and Leigh would be united. He drew attention to the fact of the roads on the estate having been so laid out that from nearly every plot views of the sea might be obtained. The Local Board had greatly improved the west of Southend, and were about to extend the Marine Parade westward to this estate, when there would be a fine marine drive and walk upwards of four miles in length. In answer to questions as to the drainage of the estate, he said that they were within the district, and under the control, of the Southend Local Board, who had now under their consideration a very comprehensive scheme for the drainage and sewerage of the entire district, which would include the estate. There was a very active demand for the several lots, the whole of which were sold at from 10*l.* to 20*l.* and 30*l.* each, a tavern-plot, having a frontage of 51 ft. and a return frontage of 97 ft., realising 72*l.* The entire proceeds of the sale amounted to about 2,600*l.*

Sale of Building Sites at Frinton.—On Monday last a further sale of building sites—the second during the present season—took place at Frinton, the new watering-place on the east coast, situated between Clacton and Walton-on-the-Naze. The plots offered were 75 in number, comprising sites on the East Cliff facing the sea, the Fourth Avenue, adjoining the West Cliff, the Crescent, Raglan-road, Old-road, and Harlston-road. Messrs. Harman Bros. conducted the sale, which took place at the Queen's Hotel, where there was a large number of buyers present. The auctioneer adverted to the great progress which Frinton was at present making, as indicated by the increasing demand for sites and the building now in progress. He pointed out that in the course of three or four weeks all the houses would be supplied with a constant water-supply, the Tendring Hundred Water Company having nearly completed the laying-down of mains, whilst gas was supplied by the Walton-on-the-Naze Gas Company. He added that a park was about to be laid out at the west end of the estate, ten acres of land close to the sea having been reserved for that purpose. Several of the plots offered had frontages of from 50 ft. to 60 ft. each, and none less than 25 ft., whilst the depths were from 120 ft. to 200 ft. Nearly the whole of the plots offered were sold at prices ranging from 2*l.* to 3*l.* per foot frontage. The sale realised 3,450*l.*, which, with 2,500*l.*, the proceeds of the sale in July last, brings up the total sum realised for the sites sold this year to close upon 6,000*l.*

The English Iron Trade.—Owing to the well-sustained demand, which for some products is increasing in volume, the English iron market continues very strong, and further advances in prices are reported this week. There is a good tone in pig-iron, the rising tendency of last week being maintained. There are slight increases in the value of Scotch pig-iron; Middlesbrough pig is quoted by makers 1s. a ton higher, and a similar advance has taken place in Lancashire. Hematites are practically unchanged, although the quotation is from 45s. 6d. to 46s. for mixed numbers of West-coast brands. The market for old material is firmer, with an upward tendency. There is an increasing volume of business in finished iron. Small bars are 5s. a ton dearer, and other manufactured iron is very firm. Galvanised iron is still rising. Business in tinplates is brisk at the advanced rates. The steel market is as active as ever, and particularly strong. The call for ship-plates is decribed as unprecedented, and in consequence manufacturers have again put up their prices, plates being now 7*l.*, and angles 6*l.* 5s. Shipbuilding is carried on with great activity, and as orders and inquiries are satisfactory, and freights are rising, better prices for new tonnage may be expected. Engineers are now full of work.—*Iron.*

Danish Railways in 1887.—The reports of the Danish railways having just been issued for the current year, 1886-1887, it appears that there were then 973 miles of state railways and 248 miles of private railways in Denmark, no new lines having been opened during the year. The number of passengers conveyed was 7,674,000 on the former and 1,238,000 on the latter, being an average per mile of 7,800 and 5,000 respectively. On the state lines, for which alone returns are furnished on this point, 0·67 per cent. travelled first-class, 12·08 per cent. second, and 87·25 per cent. third. The total receipts on the state lines amounted to 736,000*l.*, against 711,000*l.* in 1886, leaving a profit of 108,000*l.* The value of the lines was estimated at about 1,620,000*l.* The number of men employed was 5,700. Only three passengers were injured, and these but slightly. The number of private railways was eleven, three of which show a deficit in working, and the remaining eight a profit of 80,000*l.* Thus, on the state lines the profit was 111*l.* per mile, against 323*l.* on the private ones.

New Apparatus for Drying Buildings. A Russian engineer, M. De Wrozinsky, has, according to the *Novoye Vremya*, invented an apparatus for drying buildings which is said to have proved very effective. It is based on the principle of carbonic gas rapidly absorbing the moisture of the air, and to this end the inventor has constructed a closed stove burning charcoal by the introduction of air into it direct from the open through two tubes. A steady current of dry warm carbonic gas is allowed to escape into the room to be dried, which rapidly absorbs the moisture in the air, and escapes in the ordinary manner through the chimney. The apparatus has been patented.

Value of City Property.—The high price which property in the City commands was shown at a sale which took place at the Auction Mart last week, when Messrs. Farebrother, Ellis, Clark, & Co. offered for sale, by order of executors, the freehold land and buildings at the corner of Wood-street and London-wall. The property was described as occupying one of the most prominent corner positions in the City, possessing a total frontage of 166 ft. It was stated that the premises were rebuilt and completed in 1884, after the great fire in Wood-street, by the well-known builders, Messrs. Brass & Co., from the designs of Messrs. Ford and Hesketh, and that they contained altogether eight floors. They are let to Messrs. Silber & Fleming for a lease of twenty-one years from January, 1886, at a rental of 5,000*l.* per annum. Sir J. W. Ellis, who conducted the sale, described the property as amongst the most valuable in the City, whilst his own personal knowledge enabled him to say that the buildings had been erected in the most substantial manner, the elevation being unsually attractive, and presenting a fine example of architectural skill. He estimated the value of the site and buildings at something like 170,000*l.* The biddings commenced by an offer of 60,000*l.*, and by advances of 5,000*l.* each 100,000*l.* was reached, at which the property was sold.

The Railways of Finland.—From the reports just issued of the railways of Finland, ending December 31, 1886, it appears that in that year the Uleåborg railway, 210 miles in length, was opened, making the total length of the State railways 958 miles. The latter line will ultimately connect the railway systems of Russia and Finland with those of Sweden and Norway, surveys for its continuation towards the frontier being actually proceeded with. The gross returns in 1886 were 330,000*l.*, of which 135,000*l.* resulted from the passenger, and 195,000*l.* from the goods, traffic. The returns of 1885 were 150,000*l.* higher. The average receipt per mile was 340*l.* The expenditure was 210,000*l.*, the profits being thus 120,000*l.*, or 2½ per cent. interest on the capital. However, on one line there was a loss of 1½ per cent. The value of the State lines,—five in number,—was about 4,000,000*l.* There is only one private railway in the country, 20 miles in length. Under construction is the so-called Knopio railway, about 200 miles in length, which will connect the central part of Finland with the capital and the south coast, and which it is expected will be finished early next year.

Ventilation of the Guildhall, York.—Messrs. Robert Boyle & Son's system of ventilation has been applied to the Council Chamber at the Guildhall, York, an ancient structure, the ventilation of which was very defective, though a number of air inlets and open extraction-shafts were provided, but which had generally to be kept closed owing to the down-draught proceeding from them, thus rendering the ventilation practically *nil.* We are told that this has been obviated since the application of Messrs. Boyle's system, consisting, in this instance, of two of their latest improved self-acting "Air Pump" ventilators, 30 in. diameter, fixed upon the roof, and connected by means of 15-in. diameter shafts, with two hoppers placed over perforated panels in the ceiling. This provides for the extraction of the vitiated air, the supply of fresh air being admitted through seven of Messrs. Boyle's improved air inlet tubes, 5 ft. 9 in. × 10 in. × 4½ in., fixed against the walls in different parts of the chamber. Mr. E. G. Mawbey, the City Surveyor of York, writes:—"The ventilation of this Council Chamber, which I have carried out on your system, is very satisfactory, notwithstanding that the room is altogether too small for the number of persons occupying it during Council meetings."

New English Church in Norway.—A movement is on foot in this country and in Norway for the building of an English church at Bergen, on the west coast of Norway, for the benefit of English visitors, there being now only one such edifice in that country, viz., in Christiania. The cost is estimated at about 1,000*l.*, and the money is proposed to be raised by a shilling contribution from English tourists.

Archæological Discovery in Russia.—An Odessa journal states that an archæological commission making excavations in the Volga district has discovered the remains of an old town on the right bank of the Volga, which bespeak a high class of civilisation. A large quantity of Arabian, Persian, and Tartar coins were found, together with a number of objects bearing upon the life and culture of the inhabitants.

A Proposed City School of Painting.—We learn that there is some prospect of the Corporation having a School of Painting as well as a School of Music. This would be an excellent adjunct to the Art Gallery at the Guildhall. If the Corporation would find the land, and the Charity Commissioners the building, an institution of this kind might be made, like the School of Music, practically self-supporting.—*City Press.*

Erratum.—A printer's error occurred in the paragraph about Messrs. Bolding & Sons' sanitary appliances, which appeared on p, 185 of our last issue. The beginning of line 7, "From among a few," should have read "From among so many."

PRICES CURRENT OF MATERIALS.

TIMBER.	£.	s.	d.	£.	s.	d.
Teak, E.I. ..... load	8	0	0	12	10	0
Sequois, U.S. ..... foot cube	0	2	3	0	3	0
Birch, Canada ..... load	2	15	0	4	15	0
Fir, Dantsic, &c.	2	0	0	4	0	0
Oak ,, ...	2	0	0	4	10	0
Canada	4	0	0	6	10	0
Pine, Canada red	2	10	0	3	10	0
,, yellow	2	10	0	4	0	0
Lath, Dantsic ..... fathom	3	10	0	5	0	0
St. Petersburg	5	0	0	6	0	0
Wainscot, Odessa, crown	2	10	0	3	0	0
Deals, Finland, 2nd and 1st...std.100	8	0	0	9	10	0
,, 4th and 3rd	6	10	0	7	10	0
Riga	6	0	0	7	10	0
St. Petersburg, 1st yellow	9	10	0	15	0	0
,, 2nd ,, ...	8	0	0	9	0	0
,, white	7	10	0	10	0	0
Swedish	7	10	0	16	10	0
White Sea	8	10	0	17	10	0
Canada, Pine, 1st	15	0	0	24	0	0
,, ,, 2nd	9	10	0	15	10	0
,, ,, 3rd, &c.	7	10	0	9	10	0
,, Spruce, 1st	8	10	0	9	10	0
,, 3rd and 2nd	6	0	0	7	10	0
New Brunswick, &c.	6	10	0	7	5	0
Battens, all kinds	4	10	0	11	0	0

TIMBER (*continued*).	£.	s.	d.	£.	s.	d.
Flooring Boards, sq., 1 in., prepared, First	0	10	6	0	13	6
Second	0	7	0	0	10	3
Other qualities	0	4	6	0	6	9
Cedar, Cuba ..... foot	0	0	3½	0	0	3½
Honduras, &c.	0	0	3½	0	0	3½
Australian	0	0	2	0	0	3
Mahogany, Cuba	0	0	4½	0	0	5½
St. Domingo, cargo average	0	0	4½	0	0	5½
Mexican ,, ...	0	0	4	0	0	4½
Tobasco ,, ...	0	0	4½	0	0	5½
Honduras ,, ...	0	0	4½	0	0	5½
Box, Turkey ..... ton	5	0	0	12	0	0
Walnut, Italian ..... foot	0	0	4½	0	0	6
METALS.						
IRON—Bar, Welsh, in London...ton	4	17	6	5	0	0
,, ,, at works in Wales ...	4	7	6	4	10	0
,, Staffordshire, in London ...	5	5	0	6	15	0
COPPER—						
British, cake and ingot..... ton	77	10	0	78	10	0
Best selected	79	0	0	80	0	0
Sheets, strong	85	0	0	0	0	0
Chili, bars	105	10	0	0	0	0
LEAD—						
Pig, Spanish ..... ton	13	14	0	14	2	6
English, common brands	14	5	0	14	7	6
Sheet, English	14	17	6	15	5	0
SPELTER—						
Silesian, special ..... ton	18	7	6	18	12	6
Ordinary brands	18	5	0	18	10	0
TIN—						
Straits ..... ton	104	0	0	0	0	0
Australian	104	0	0	0	0	0
English Ingots	106	10	0	0	0	0
ZINC— English sheet..... ton	21	0	0	0	0	0
OILS.						
Linseed ..... ton	18	17	6	19	0	0
Cocoanut, Cochin	25	0	0	27	10	0
Ceylon	24	0	0	24	10	0
Palm, Lagos	21	10	0	22	0	0
Rapeseed, English pale	27	10	0	0	0	0
,, brown	26	0	0	26	5	0
Cottonseed, refined	20	15	0	21	0	0
Tallow and Oleine	25	0	0	45	0	0
Lubricating, U.S.	4	0	0	6	0	0
,, refined	7	0	0	12	0	0
TURPENTINE—						
American, in casks..... cwt.	1	8	9	0	0	0
TAR—						
Stockholm ..... barrel	0	16	0	0	16	6
Archangel	0	10	0	0	10	6

COMPETITION, CONTRACTS, & PUBLIC APPOINTMENT.

Epitome of Advertisements in this Number.

COMPETITION.

Nature of Work.	By whom required.	Premium.	Designs to be delivered.	Page.
New Offices, &c., at Cardiff	Messrs. Cory Bros. & Co.	50*l.* and 25*l.*	Not stated...	i.

CONTRACTS.

Nature of Work, or Materials.	By whom required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.	Page.
New Main Sewers	Leicester Corporation...	J. Gordon	Sept. 20th	ii.
Repair of Roads and other works, New Cross...	Met. Asylums Board ...	Jarvis & Son	do.	ii.
Timber Goods Shed at New Mills.....	Midland Railway Co....	*Official*	do.	ix.
Repairs to Eight Houses, Poplar	Mr. Beer, of Woodford	.....	do.	ix.
Broken Granite and Flints	St. Matt , Bethnl Green	F. W. Barratt	do.	ix.
Wrought Iron Girders	Romford Local Board...	*Official*	Sept. 21st	ix.
Excavating Chalk at Basingstoke, &c.	Gt. Western Railway Co.	do.	Sept. 22nd	ii.
Re-building Workhouse at West Beckham ...	Erpingham Union	do.	do.	ii.
Sundry Repairs, Painting, and Whitewashing	Central London Sick Asylum District	do.	Sept. 24th	ii.
Re-construction of Sanitary Fittings, &c.	Romford Union	C. J. Dawson.....	do.	ii.
Road-Making Works	Tottenham Local Board	J. E. Worth	Sept. 25th	ii.
Laying Cast-iron Pipes	Nelson Local Board.....	J. Newton & Son.....	Sept. 27th	ix.
Sluice Valves, Hydrants, &c.	do.	do.	do.	ix.
School Extensions and Alterations	Burton-on-Trent (U.D.) School Board	R. Churchill	do.	ii.
School Room, Llanelly.....	The Committee.....	.....	Sept. 28th	ix.
Street Works	Sevenoaks Local Board	Jabez Mann	Sept. 29th	ix.
Stores.....	Great Western Ry. Co.	*Official*.....	Oct. 1st	ii.
New Bridge across Grand Surrey Canal.....	Met. Board of Works...	do.	Oct. 4th	ix.
Works and Repairs to Buildings	Com. of H. M. Works...	do.	Oct. 5th	ii.
Houses with Outbuildings, Seaton Sluice	Admiralty	do.	do.	ix.
Shop and Premises at Blackfriars.....	.....	J. F. Shaw.....	Not stated...	ix.
Volunteer Offices, &c., North Shields	War Department.....	*Official*.....	do.	ii.
Block of Warehouses, Ratcliff, E.	.....	J. Sawyer	do.	ix.
Detached Houses, Tunbridge Wells	.....	W. B Hughes	do.	ix.

PUBLIC APPOINTMENT.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.	Page.
Surveyor and Inspector of Nuisances	Dartford Local Board...	200*l.*	Sept. 27th	xiv.

TENDERS.

[Communications for insertion under this heading must reach us *not later than* 12 *Noon on Thursdays.*]

ARNOLD (Notts.).—For making, metalling, and channelling Portland-street, Arnold, near Nottingham, for the Arnold Local Board of Health. Quantities by the engineer, Mr. F. Jackson, C.E., 18, Low Pavement, Nottingham :—

Fredk. Messon	£287	0	0
Wm. Frost.....	259	12	0
John Greaves	217	12	0
Edward Cope.....	211	3	0
Arthur Raynor	210	3	2
R. & G. Holmes	200	0	0
John Hawley & Son.....	195	0	0
Wm. Cordon, Burton Joyce, near Nottingham (accepted)	179	6	0

[Engineer's estimate, £211.]

BERMONDSEY.—For repairing and painting exterior, and sundry works to the interior, of Parish-street Workhouse, for the Guardians of St. Olave's Union. Messrs. Newman & Newman, architects, 31, Tooley-street, London Bridge :—

Balaam Bros.	£920	0	0
G. Parker	797	0	0
G. Poxton	549	0	0
Bellchamber & Son.....	525	0	0
A. Martin	480	0	0
J. Bullers	475	0	0
W. G. Lilly (accepted)	357	0	0

ENFIELD.—For erection of house for Mr. Greenwood. Messrs. Searle, Halton, & Bowyer, surveyors, Tottenham :—

Harrison & Wall	£298	0	0
Cook	249	0	0
Monk	238	0	0
Smithers (accepted)	179	10	0

BRENTFORD.—For covering over brook and widening Back-lane West, for the Brentford Local Board. F. W. Lacey, Assoc.-M.Inst. C.E., surveyor :—

H. Haynes, Alperton	£875	0	0
E. Rogers & Co., Notting Hill	873	0	0
G. Bell, Tottenham.....	848	0	0
G. R. Rackham & Co., Colchester	713	0	0
Wm. Parker, Brentford.....	675	13	10
W. Neave & Co., Paddington*.....	649	10	9

* Accepted.

EPSOM.—For additions and alterations to Union Workhouse, Epsom, Surrey, for the Guardians. Mr. Herbert D. Appleton, architect. F. T. W. Miller, quantity surveyor :—

Jeal.....	£10,250	0	0
Parker	9,949	0	0
Clarke & Bracey	9,539	0	0
H. Knight.....	9,465	0	0
A. Bricknell.....	9,290	0	0
Shillitoe & Son	9,250	0	0
Taylor.....	9,250	0	0
G. Stephenson.....	9,187	0	0
Goddard & Son	9,186	0	0
Rose & Co.	9,048	0	0
J. Wyatt	8,920	0	0
H. Willcock	8,885	0	0
E. J. Burnand.....	8,642	0	0
Ward Bros.	8,604	0	0
R. Wood	8,583	0	0
T. Martin	8,565	0	0
J. Longley	8,400	0	0
A. R. Flew	8,290	0	0
Howe & White	8,250	0	0
W. H. Lowden & Son	8,250	0	0
Ward, Clarke, & Co.....	8,157	0	0
J. Chappell	8,146	0	0
W. H. Simmonds	7,991	0	0
R. J. Humphris	7,700	0	0
H. Tarrant	6,982	0	0

HORNSEY.—For concrete footway pavements, for the Hornsey Local Board. Mr. T. de Courcy Meade, Engineer and Surveyor :—

	s.	d.	
Thomas Torode	7	0	per yard super.
F. A. Jackson & Son.....	6	7	,, ,,
A. E. Wilson & Co.	6	4½	,, ,,
Alfred Walker.....	6	2	,, ,,
Malcolm, Macleod, & Co.	6	1½	,, ,,
W. Millar & Co.....	6	0	,, ,,
Stuart's Granolithic Paving Co.	6	0	,, ,,
Patent Paving and Construction Co., Limited	5	9	,, ,,
Ernest Homan	5	6	,, ,,
Patent Victoria Stone Co.	5	5	,, ,,
Grano-Metallic Pavement Co.*	5	1	,, ,,
John Mowlem & Co.	4	10	,, ,,
Imperial Stone Co., Limited ...	4	9	,, ,,
Jones's Annealed Concrete Co.	4	0½	,, ,,

* Accepted.

[Each of the persons tendering was asked to specify the particular kind of material proposed to be used, consequently the quality and proportions of materials, and thickness of pavement tendered for, varied in most cases.]

IPSWICH.—For alterations and additions to Belstead Hall, for Mr. A. Harwood. Mr. John S. Corder, architect, Ipswich :—

Geo. Kenney.....	£112	0	0
Bennett (bath and fittings)	41	10	0

IPSWICH.—For additions to a residence, Willoughby-road, Ipswich, for Mr. I. L. Ensor. Mr. John S. Corder, architect, Ipswich :—

Geo. Kenney	£210	0	0

LONDON.—For the erection of banking premises at High-street, Camden Town, for the Alliance Banking Company (Limited). Mr. Frederick Pinches, architect. Quantities by Messrs. T. Thornton Green & Pietersen, 12, Poultry :—

Lamble	£8,759	0	0
Chas. Wall.....	8,722	0	0
Dixon	8,700	0	0
Colls & Sons	8,434	0	0
Chas. Cox	8,398	0	0
Drew	8,384	0	0
Patman & Fotheringham	8,303	0	0
Morter.....—.....	8,300	6	0
Mark Patrick & Son	8,270	0	0
Grover & Son	8,248	0	0
Toms.....	8,039	0	0

LONDON.—For alterations, &c., at the "Black Friar," Queen Victoria-street, E.C., for Mr. G. Cox. Mr. H. I. Newton, architect, 17, Queen Anne's Gate, S.W. :—

H. Burman & Sons, Kennington Park..	£305	0	0
Larter, City	295	0	0
S. R. Lamble, Kentish Town	289	0	0
S. Godden, Bryanston-square	265	0	0
Smith & Son, Belgrave-square.....	256	0	0
J. Beal, Westminster Bridge road* ...	248	0	0

* Accepted.

LONDON.—For alterations, &c., at the "White Hart," Myddelton-street, Clerkenwell, E.C., for Mr. Wm. Pierpoint. Mr. H. I. Newton, architect, 17, Queen Anne's Gate, Westminster, S.W. :—

H. Burman & Son, Kennington Park	£1,399	0	0
Jackson & Todd, Hackney.....	1,349	0	0
S. Godden, Bryanston-square	1,332	0	0
S. R. Lamble, Kentish Town.....	1,239	0	0
Walker, Poplar.....	1,100	0	0
W. L. Kellaway, Islington*	1,073	0	0

* Accepted.

LONDON.—For alterations to 120, Tottenham-court-road, for the Aërated Bread Company. Mr. G. Edwards, architect, 52, Cannon-street :—

Scrivener & Co.	£1,601	0	0
Martin Wells & Co.	1,560	0	0
Scharien	1,554	0	0
C. Wall	1,550	0	0
Craske	1,499	0	0
Holloway Bros.....	1,473	0	0
Barnet	1,417	0	0
Green & Lea	1,387	0	0
Ward & Lamble (accepted)	1,375	0	0

LONDON.—For a shop-front and fittings to new premises, Upper-street, Islington, for Mr. J. Chambers. Mr. Eugène C. Beaumont, architect:—

Williams	£548	0	0
Lascelles & Co.	540	0	0
Drew & Cadman	493	0	0
Mollett (accepted)	405	0	0

LONDON.—For repairs, painting, &c., at 30, Fitzroy-square, W., for Mr. H. J. Bradley. Mr. John H. Martin, 83, Albany-road, S.E., surveyor:—

Bywaters	£297	0	0!
Dixon, Highgate	217	0	0
Gould & Brand, Camden Town	187	10	0
Wallden, Walworth (accepted)	145	0	0!

LONDON.—For repairs and decorations at the "Prince Albert," Provost-street, Hoxton, for the Berkshire Brewery Company. Mr. Herbert E. Saunders, architect, 18, Walbrook, E.C.:—

F. W. Milman,* New Cross-road	£144	0	0

* Accepted.
[No competition.]

MILE END. — For repairs to cottages, Sidney-street. Messrs. Searle, Halton, & Bowyer, surveyors, Tottenham:—

Smithers	£104	6	0
Porter	95	0	0
Monk	92	0	0

NEW BARNET.—For additions and alterations at "Lymsdown Hall," for the Committee. Mr. Joseph White, surveyor, High-street, Barnet:—

Smith, Tottenham	£248	8	6
Ellwood, New Barnet	210	0	0
Voller, Wood Green	195	0	0

PORTO ALEGRE (Brazil).—For machinery and plant for Brazilian Extract of Meat and Hide Factory, Limited, Porto Alegre, Brazil, from the designs of Mr. Frederick Colyer, engineer, 18, Great George-street, Westminster, S.W.

No. 1 *Contract*, "*Extract of Meat Plant.*"

Fawcett, Preston, & Co.	£1,970	0	0
Pontifex & Wood	1,644	0	0

No. 2 *Contract*, "*Patent Water-Tube Boilers.*"

Patent Steam Boiler Co.	£2,879	0	0
Babcock Wilcox & Co.	2,060	0	0

No. 3 *Contract*, "*Pumping Machinery.*"

Simpson & Co.	£997	0	0
G. Waller & Co. (error in estimate)	896	0	0
Moreland & Son	695	0	0
Fawcett, Preston & Co.	690	0	0

No. 4 *Contract*, "*Charcoal Plant.*"

G. Waller & Co.	£498	0	0

No. 5 *Contract*, "*Lancashire Boilers.*"

Fawcett, Preston & Co.	£2,290	0	0
Horton & Son	2,040	0	0
Thornewill & Warham	1,970	0	0

ROTHERHITHE. — For repairing, painting, lime-whiting, &c., to the interior, and repairing and painting the exterior, of the Infirmary, Rotherhithe, for the Guardians of the St. Olave's Union. Messrs. Newman & Newman, architects, 31, Tooley-street, London Bridge:—

Balaam Bros.	£1,200	0	0!
Bellchamber & Son	945	0	0
A. Mackie	896	0	0
G. Parker	890	0	0
J. & J. Greenwood	874	0	0
W. Furniss	799	0	0
J. Bullers	798	0	0
Bargman & Son	733	0	0
W. G. Lilly	669	0	0
Vigor & Co.	633	0	0
Twitchin & Ansell	630	0	0
A. Martin (accepted)	300	0	0!

ROTHERHITHE.—For repairing, painting, and lime-whiting the interior, and repairing and painting the exterior, of the Casual Wards, Rotherhithe, for the Guardians of the St. Olave's Union. Messrs. Newman & Newman, architects, 31, Tooley-street, London Bridge:—

Balaam Bros.	£155	0	0!
G. Parker	116	0	0
A. Mackie	103	0	0
J. & J. Greenwood	98	0	0
Vigor & Co.	95	10	0
Bargman & Son	95	0	0
W. G. Lilly	93	0	0
J. Bullers	90	0	0
Bellchamber & Son	89	10	0
A. Martin (accepted)	42	10	0!

Alterations, Cheyne-walk, Chelsea.—Mr. F. Blandford, of 21, Avenell-road, Highbury, writes to say that his tender for this job (see list on p. 186 of our last issue) was 755*l.*, and not 595*l.* We printed the list as it was sent to us by Mr. Cole.

TO CORRESPONDENTS.

G. F. H. (shall appear).—W. F. R.—W. H. C. (amounts should be sent).—R. A. L. (ditto).—F. B. (list not received).—E. S. (too late).—N. & W. (too late).

All statements of facts, lists of tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication

We are compelled to decline pointing out books and giving addresses.

NOTE.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters or communications (beyond mere news-items) which have been duplicated for other journals, are NOT DESIRED.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; all communications relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and *not* to the Editor.

PUBLISHER'S NOTICES.

Registered Telegraphic Address, "THE BUILDER, LONDON."

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PREPAYMENT IS ABSOLUTELY NECESSARY.

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DOUGLAS FOURDRINIER, Publisher,
Addressed to No. 46, Catherine-street, W.C.

Advertisements for the current week's issue must reach the Office before THREE o'clock p.m. on THURSDAY, and for the Front Page by the same Hour on WEDNESDAY.

SPECIAL.—ALTERATIONS IN STANDING ADVERTISEMENTS or ORDERS TO DISCONTINUE same must reach the Office before TEN o'clock on WEDNESDAY mornings;

The Publisher cannot be responsible for DRAWINGS, TESTIMONIALS, &c. left at the Office in reply to Advertisements, and strongly recommends that of the latter COPIES ONLY should be sent.

PERSONS Advertising in "The Builder," may have *Replies addressed to the Office, 46, Catherine-street, Covent Garden, W.C. free of charge.* Letters will be forwarded if addressed envelopes are sent, together with sufficient stamps to cover the postage

AN EDITION Printed on THIN PAPER, for FOREIGN CIRCULATION, is issued every week.

Now ready.

READING CASES, { NINEPENCE EACH. By post (carefully packed), 1s.

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HIGH-CLASS JOINERY.

LASCELLES' CONCRETE.

Architects' Designs are carried out with the greatest care.

CONSERVATORIES,
GREENHOUSES,
WOODEN BUILDINGS,

Bank, Office, & Shop Fittings.

CHURCH BENCHES & PULPITS.

ESTIMATES GIVEN ON APPLICATION.

TERMS OF SUBSCRIPTION.

"THE BUILDER" is supplied DIRECT from the Office to residents in any part of the United Kingdom at the rate of 19s. per annum PREPAID. To all parts of Europe, America, Australia, and New Zealand, 26s. per annum. To India, China, Ceylon, &c. 30s. per annum. Remittances payable to DOUGLAS FOURDRINIER, Publisher, No. 46, Catherine-street, W.C.

SUBSCRIBERS in LONDON and the SUBURBS, by prepaying at the Publishing Office, 19s. per annum (or 4s. 9d. per quarter), can ensure receiving "The Builder" by *Friday Morning's post.*

BEST BATH STONE.

CORSHAM DOWN. | FARLEIGH DOWN.
BOX GROUND. | COMBE DOWN.
WESTWOOD GROUND. | STOKE GROUND.

THE BATH STONE FIRMS, Limited.
HEAD OFFICES: BATH.

DOULTING FREESTONE.

THE CHELYNCH STONE. The stone from these quarries is known as the "Weather Beds," and is of a very crystalline nature, and undoubtedly one of the most durable stones in England.

THE BRAMBLEDITCH STONE. Is of the same crystalline nature as the Chelynch Stone, but finer in texture, and more suitable for fine moulded work.

Prices, and every information given, on application to CHARLES TRASK & SONS, Doulting, Shepton Mallet.

London Agent—Mr. E. A. WILLIAMS, 16, Craven-street, Strand, W.C. [ADVT.

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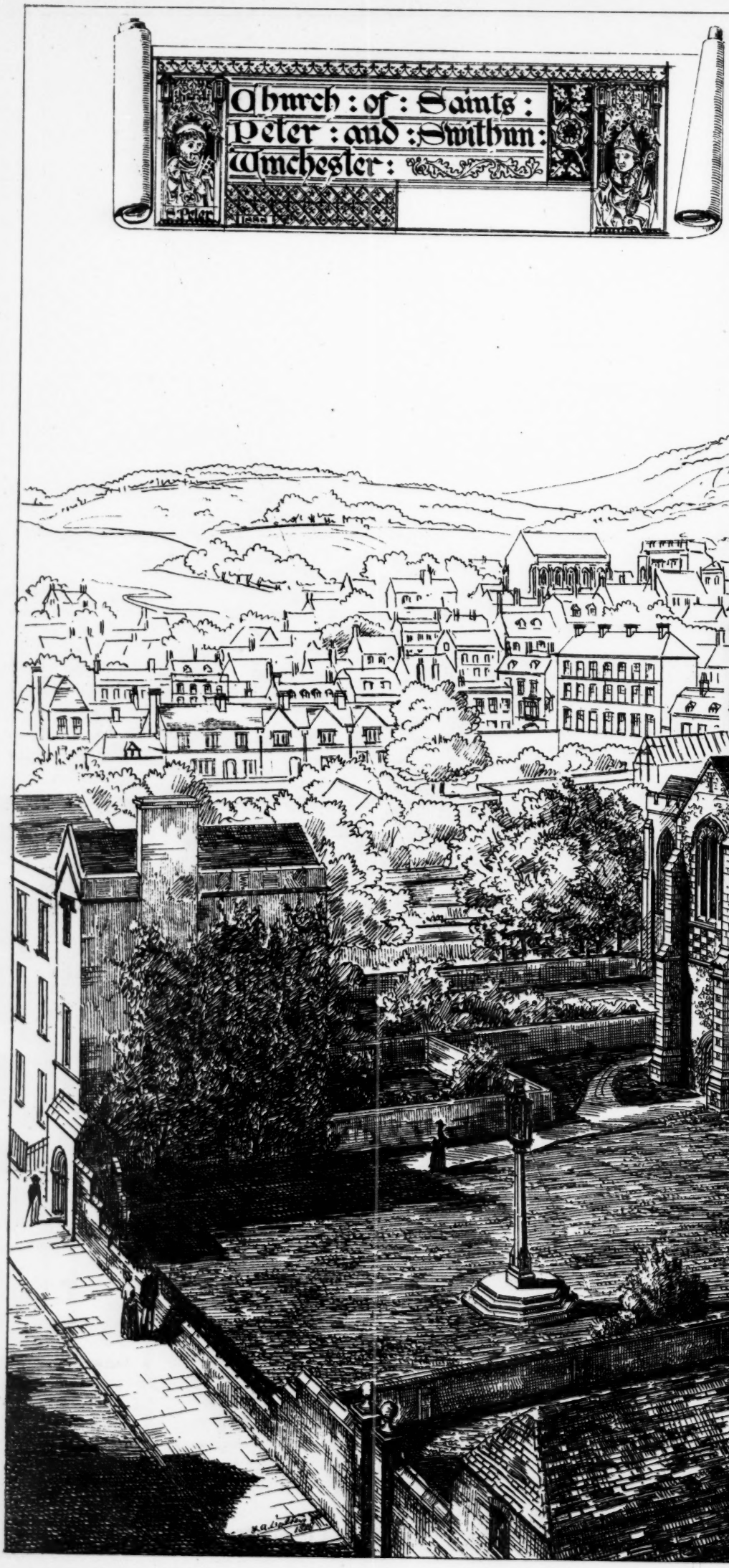
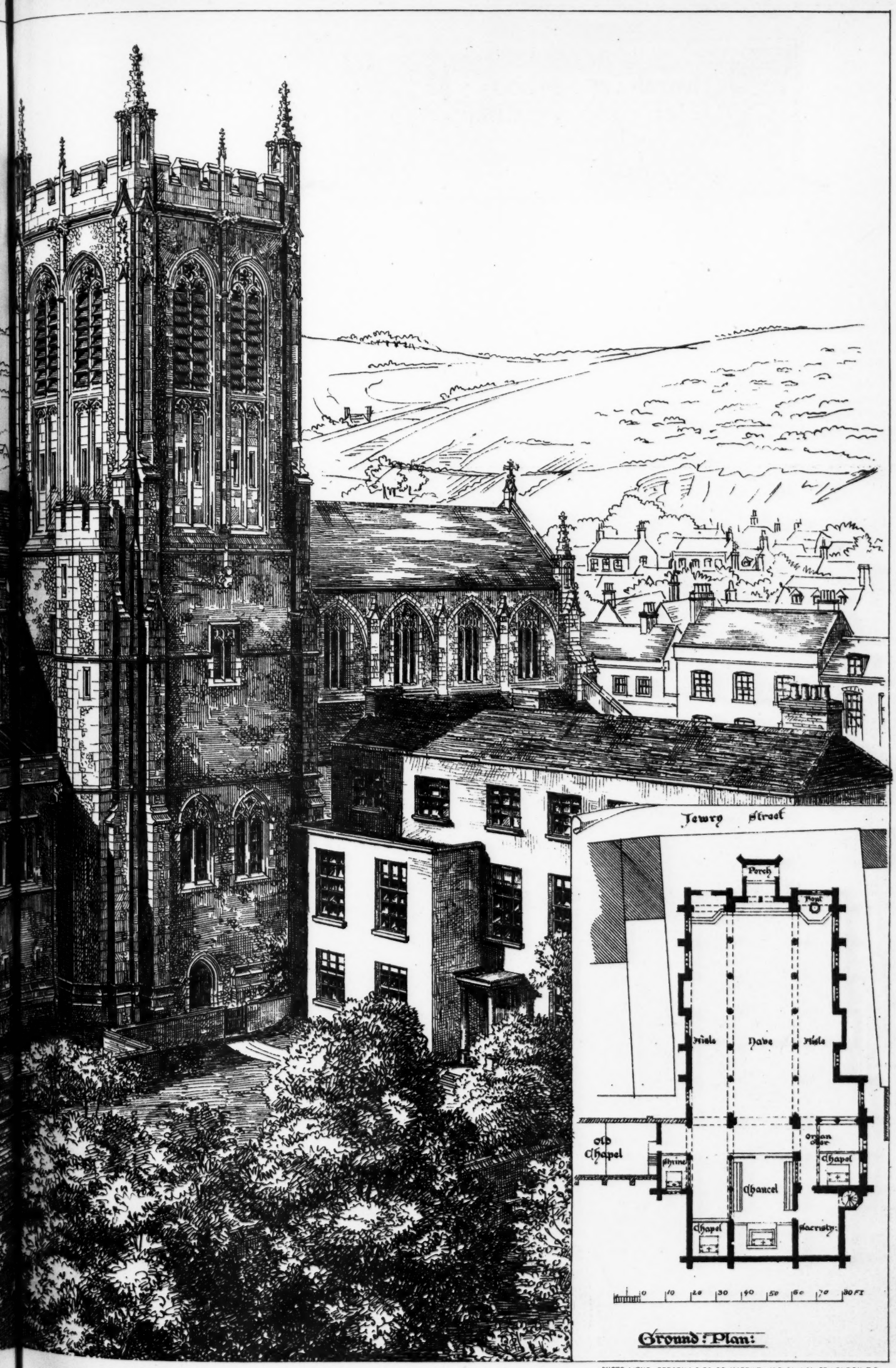


CHURCH OF S.S. PETER AND SWITHUN, WINCHES[illegible]R.—Mr.



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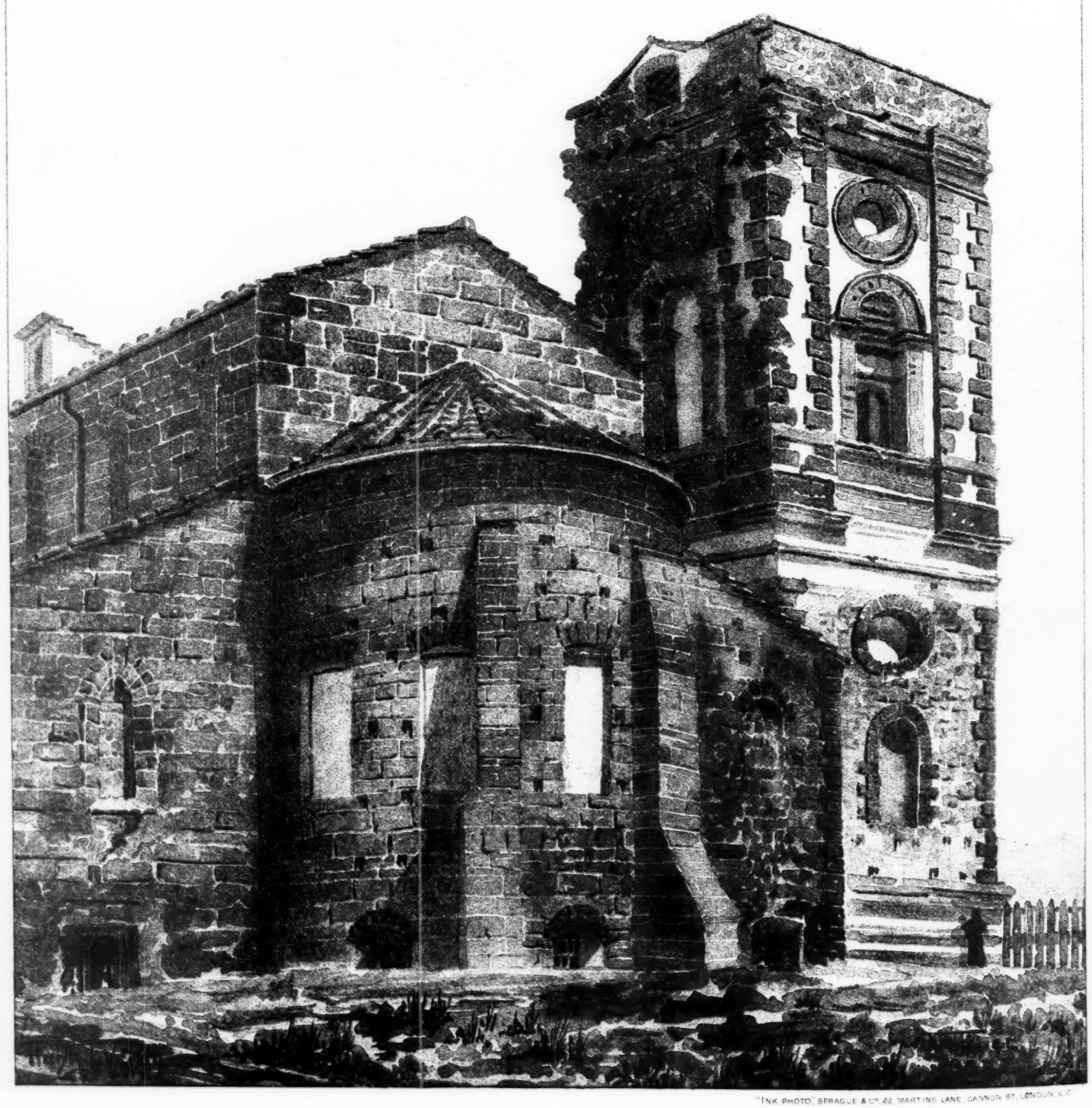
HES[illegible]R.—Mr. Frederick A. Walters, F.S.A., Architect.



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TOWER OF SAN MINIATO, FLORENCE.—From a Sketch by Mr. Frank T. Verity.

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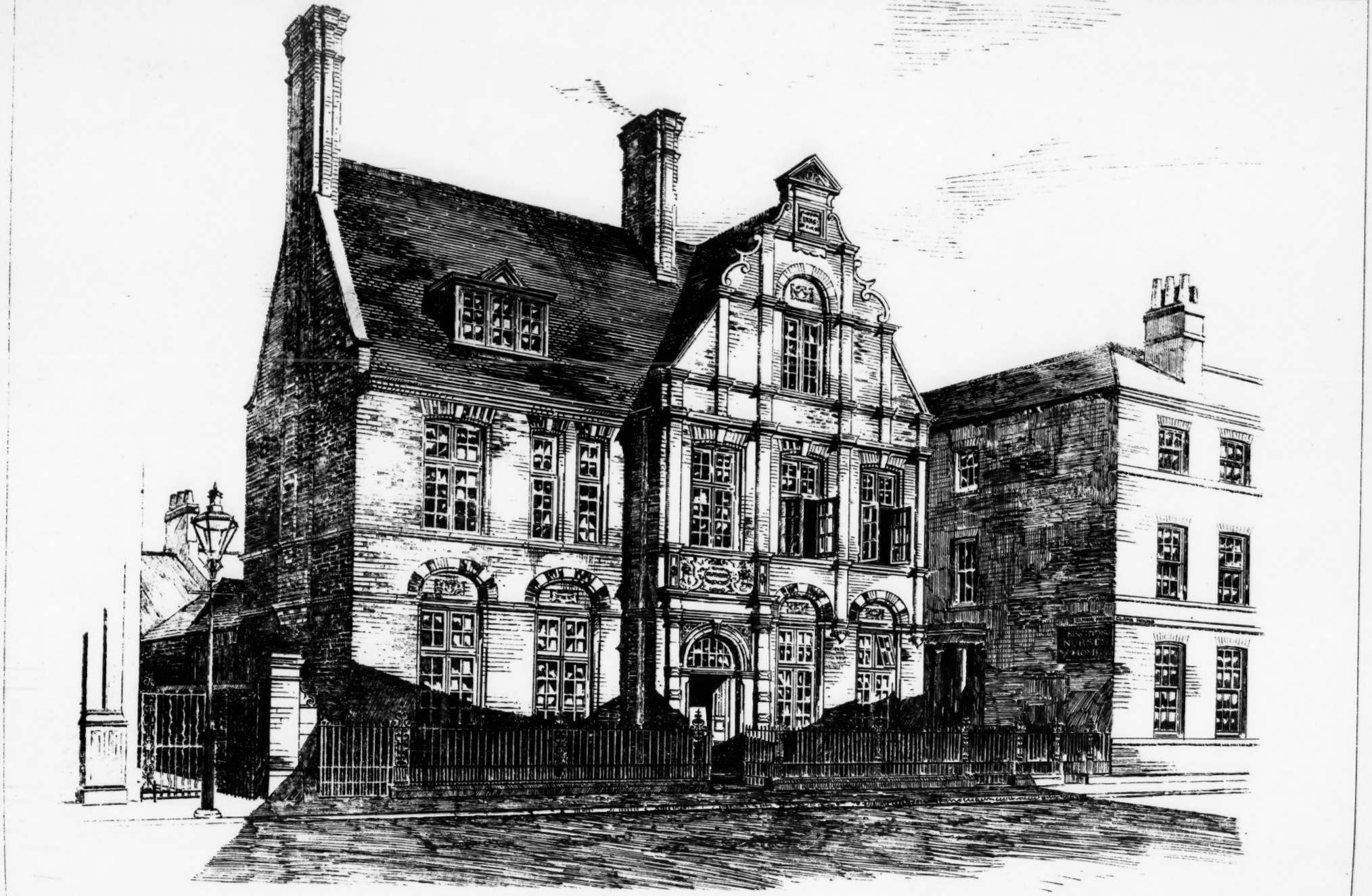
THE THIERGÄRTNER THOR, NUREMBERG.—From a Sketch by Mr. Frank T. Verity.



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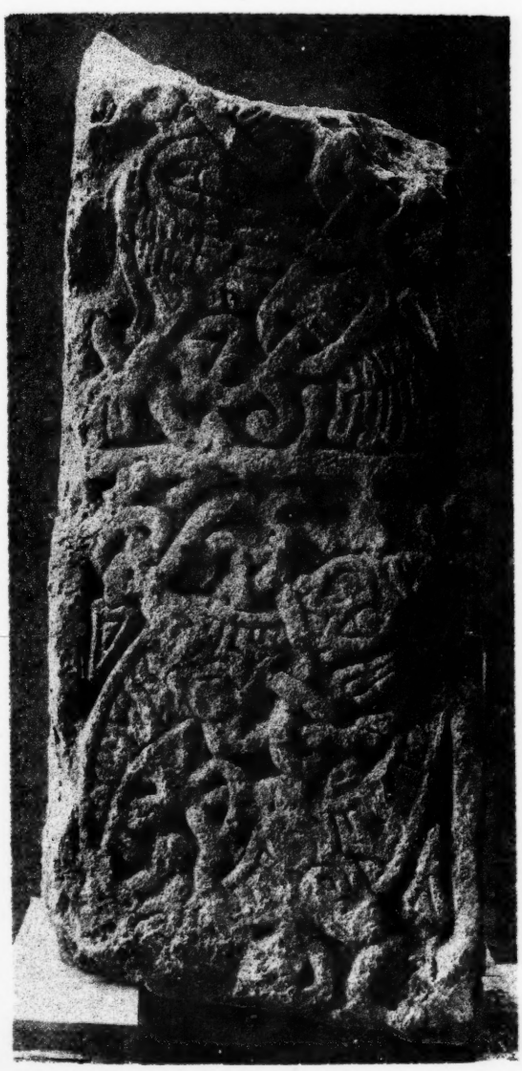
THE HULL AND SCULCOATES DISPENSARY.—Messrs. Botterill, Son & Bilson, Architects.

RIGHT SIDE.

FRONT.



LEFT SIDE.

BACK.

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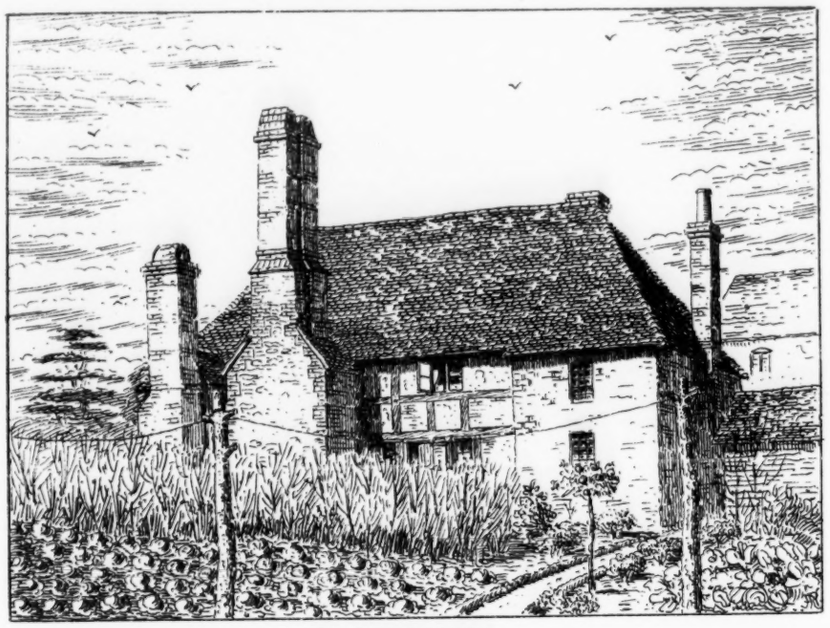
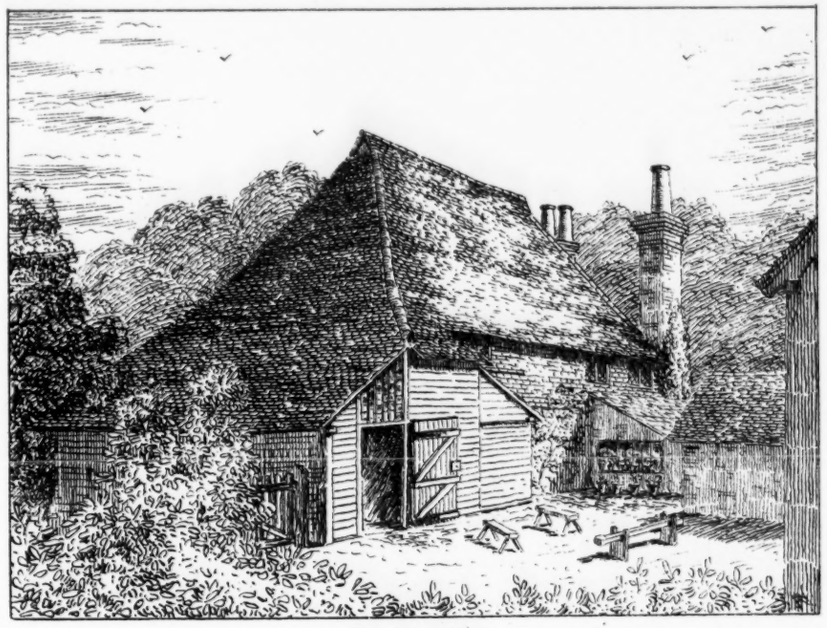
ANCIENT CROSS FOUND AT GLOUCESTER.



AT FARNCOMBE.



AT ALBURY.

AT FARNCOMBE.

SHOPHOUSE FARM, FARLEY.

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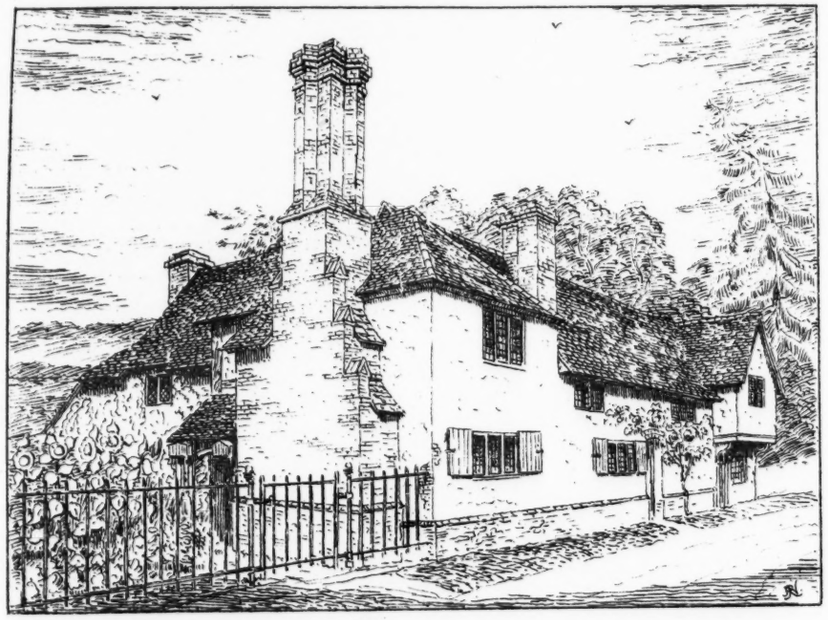
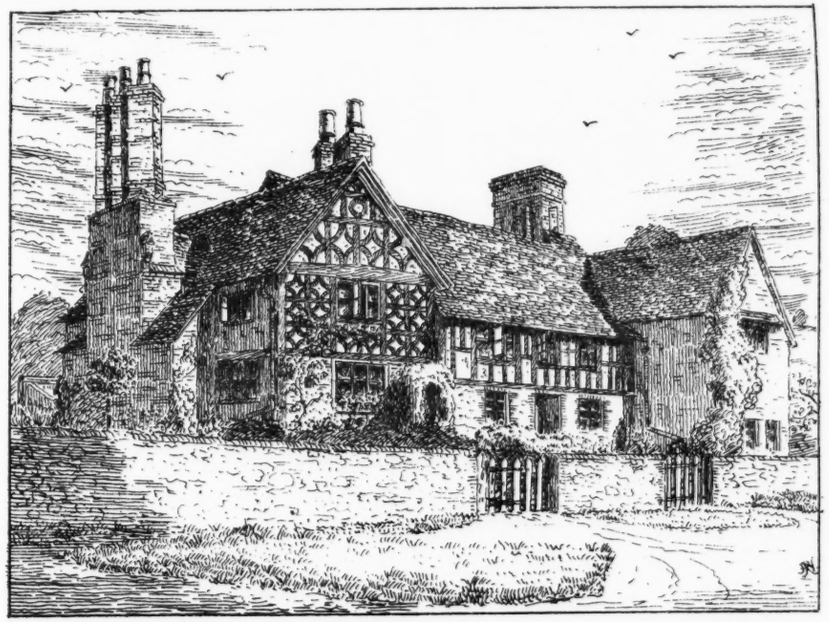
OLD COTTAGE ARCHITECTURE.—From Sketches by Mr. Ralph Nevill, F.S.A.

THE BUILDER, SEPTEMBER 15, 1888.



AT SHIERE.



AT GOMSHALL.

PADDINGTON MANOR.

NEAR ABINGER HAMMER.

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OLD COTTAGE ARCHITECTURE.—From Sketches by Mr. Ralph Nevill, F.S.A.